

KEY

TO THE

ELEMENTARY ARITHMETIC;

INCLUDING

The Solution of nearly all the Problems.

BY JOHN HERBERT SAWYER, M.A.

MATHEMATICAL MASTER AND TUTOR IN CHEMISTRY AND
NATURAL PHILOSOPHY IN THE NORMAL SCHOOL
FOR UPPER CANADA.

Toronto:

PRINTED AND PUBLISHED BY JOHN LOVELL

AND SOLD BY R. & A. MILLER.

Canada:

R. & A. MILLER 66 KING STREET EAST.

1881

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K. Y.

THE ACT OF THE PROVINCIAL PARLIAMENT

The following work is intended chiefly for a
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Entered, according to the Act of the Provincial Parliament, in
the year one thousand eight hundred and sixty-one, by JOHN
LOVELL, in the Office of the Registrar of the Province of
Canada.

multifarious duties of the school-room as to pre-
vent them devoting to some of the problems as
much time as they might otherwise demand.

Toronto, November, 1861.

PRINTED AND PUBLISHED BY JOHN HARRIS

AND JOHN E. A. HARRIS

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THE ACT OF THE PROVINCIAL PARLIAMENT

PREFACE.

The following work is intended chiefly for a numerous class who are unable to devote their time to attendance at school, and on that account it was thought better to supply the student with the solutions of nearly all the problems in the Elementary Arithmetic. It may also be useful to teachers whose time is so much occupied in the multifarious duties of the school-room as to prevent them devoting to some of the problems as much time as they might otherwise demand.

TORONTO, November, 1861.

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KEY TO ELEMENTARY ARITHMETIC.

EXERCISE 1.

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- Twenty-seven; one hundred and sixty-four; nineteen; ninety-one; one hundred and seven; seven hundred and eighty-nine; four hundred and twenty-six; nine hundred and ninety-nine.

4. Sixteen; thirteen; twelve; sixty-one; thirty-one; twenty-one; four hundred and nine; seven hundred and seventeen; eight hundred.
5. 28, 517, 11, 65, 209, 40, 19.
6. 137, 906, 71, 807, 250.
7. One hundred and sixty-three; four hundred and three; seven hundred and one; eight hundred and eight; nine hundred and seventeen; eight hundred; seven hundred and eleven.
8. 79, 840, 711, 416, 505.
9. Nine hundred and nine; eighty-one; seventeen; one hundred and eleven; six hundred and six; five hundred and ten; one hundred and seventy; nine hundred and nineteen.
10. 59, 17, 71, 19, 940, 61, 412.

EXERCISE 2.

1. Seven thousand and forty; eight thousand one hundred and one; eight thousand and nine; four thousand and seventy; eight thousand and nineteen; six thousand one hundred and eleven; ninety-six thousand and three; eight millions six hundred and seventy-four thousand five hundred and sixty-seven.
2. Ninety-one millions one hundred and thirty-one thousand one hundred and forty; nine hundred and sixty-seven millions four thousand two hundred and ninety-six; sixty-one trillions three hundred billions four hundred millions seven thousand six hundred and twenty-three.

3. One trillion one billion one million one thousand and one; six hundred and seventy billions and sixty-nine; eighty-one trillions eight billions one hundred millions eight hundred and ten thousand and eighty-one.
4. Ninety-one billions two hundred and thirty-four millions thirteen thousand four hundred and two; ninety-one billions two hundred and thirty-four millions two hundred and sixty-seven thousand one hundred and nine; one hundred trillions two hundred millions three thousand and four.
5. Sixty-seven trillions one hundred and eighty-nine billions four hundred and fifty-six millions seven hundred and thirteen thousand four hundred and twenty-seven; nine quintillions one hundred quadrillions nine trillions one hundred and thirty-four billions six hundred and seventy-one thousand and one.
6. Seven hundred and thirteen sextillions four hundred and fifty-six quintillions seven hundred and nineteen quadrillions one hundred and thirty-four trillions six hundred and thirteen billions forty-one thousand two hundred and thirty-four.
7. One hundred quadrillions one trillion and one million; two hundred and three trillions forty billions five hundred and six millions seventy thousand eight hundred and nine.
8. Nine hundred and eight trillions seven billions six hundred thousand and five; four trillions three billions two hundred thousand and one.

9. Two billions forty-six millions eight thousand and ten; eleven billions one hundred and eleven billions one hundred and eleven millions one hundred and eleven thousand one hundred and eleven.
10. Forty thousand and seven; nine billions and nine; eight hundred and seventy billions eight millions seven hundred thousand and eighty-seven.

EXERCISE 3.

1. 3029, 6617, 6500, 8008, 9207, 4010, 7061, 8700.
2. 87411, 94008, 30415, 24024, 70600, 30001.
3. 587000, 304083.
4. 782709.
5. 604090.
6. 17000081, 40002006.
7. 140602007, 20000011.
8. 807020110, 700020000.
9. 5005005005, 20000000001.
10. 60000060000060.
11. 17000007000070.
12. 8070400276.

EXERCISE 4.

1. 9, 18, 33, 44, 99, 478, 330, 47, 74.
2. 777, 296, 843, 910, 1001, 1400.
3. 102, 511, 1539, 3030, 2858, 301.
4. 333, 10000, 90000, 6000, 5977, 27027, 40444.
5. 1899, 2222, 4595, 9604, 8888.
6. CCH, XLVII, XCI, LXXX, XX, LXXVII, CI, X, OXI, DCVI.

Exercises 3-5.]

KEY.

9

7. CDXXXVII, CMVIII, DCCOXCIX, DCCLXIII,
CDXCVII, DCCOXXIX, DCCOXXVII,
CMXCIX, DCCCLXXXVIII.
8. MMCCXXXIII, MMMCCXXXII, MMMCCOXXXIII,
M^VCCOXXI, MCCXXXIV, ^VDCLXXVIII,
^VMMMDCCCLV.
9. M^{CM}CMXCIX, ^{XXV}DCLXXI, DCCO^{CM}CCOXLVII,
CM^{XXM}CCOXLII, ^{XV}MDCCXIII.
10. ^{OX}OMOMXIX, ^{XXM}XOXXXIV, ^{XXMM}MODLXIVI,
^{OM}MMCCOXLV, MDCL^{XXV}MMCMXIII,
MMMOD^VMDCCXIII.

EXERCISE 5.

(7)	(8)	(9)	(10)
713	12100	1020	222
80	2210	304	1111
3	1001	1111	3233
	421	3212	1212
796	10002		90000
		5647	
	25734		95878

(11)	(12)
60004	23
8000	416
* 741	3060
21000	3499
39745	

Y. ANITA

and and
eleven
ons one
red and
M 3
and nine;
illions

00.

(7)

80

3

796

25734

39745

3

416

3060

3499

23

416

3060

3499

23

416

3060

3499

23

416

3060

3499

23

416

3060

3499

EXERCISE 6.

(17)	(18)	(19)	(20)
1247	13147	8	12
91679	9	27	21
27	61946	93	679
1987	27	47	976
1800	1416	679	769
1796	934	496	9198
	1346	9999	4617
98536	16137		9860

100 11347
76649 26132

8

967

172686

(21)	(22)	(23)	(24)
460	27016	67009	207609
7019	8007	49686	11000016
4850	60425	525018	5460720
9026	84611	3011	66229087
7999	19019	85727	987000617
1400	55700	16007	5735
6021	90704		
5087		746456	8069843784
4567	345482		

46429

(25)	(26)	(27)	(28)
47	63	\$13526156	2248016
89	58	6420224	3645320
217	79	4566376	4547224
104	57	3545508	4275896
120	63	849392	5496718
287		524264	
	320		20213174
864		\$29431920	

Exercises 6-8.]

KEY.

11

(20)	(29)	(30)	(31)
12	749	1497	1793
21	1117	1509	84
679	890	1164	1877
976	1279	1447	
789	—	1523	
9198	4035	1498	
4617	—	—	
9860	—	8638	
8132	—	—	

EXERCISE 7.

(9)	(10)
807965778	5704980
803861725	5304640
204104053	400340

(13)	(14)	(15)
70460	800000	407080
9080	28647	998
61374	701353	406082

(16)	(17)	(18)	(19)
76000008	4070090	27043006	960
11978529	680704	20700080	576
<u>64021479</u>	<u>3392386</u>	<u>6342926</u>	<u>384</u>
(20)	(21)	(22)	
47090	4260000	17+61+63+24=165	
28796	3000000	276	
<u>18294</u>	<u>1260000</u>	<u>165</u>	
		111	

(23)

$$\$12 + \$17 + \$29 + \$144 + \$716 + \$690 = \$1628$$

From \$2700

Take \$1628

$$\$1072 = \text{Remainder.}$$

(24)

To \$714

From \$1793

Add \$417

Take \$1131

Sum = \$1131

Remainder = \$662 = share of 3rd.

(25)

\$17896

\$14070

\$3826

769

861

1630 = sum.

(26)

From 1630

Take 708

922 = rem.

(27)

(27)

27000017

6179

26938238

(18)

10000

2000

2000

(28)

50000

80000

25000

45000

10000

10000

15000

235000

From 800000

Take 235000

565000 = remainder.

200

196

261

658

(29)

Take any four numbers each greater than 100 which together do not amount to 743; subtract their sum from 743 and the remainder will be the 5th number.

Thus, let 107, 111, 123, and 146 be four of the numbers. Then $107 + 111 + 123 + 146 = 487$.

From 743

Take 487

Rem. = 256 = 5th number.

(30)

Let 204, 718, and 500 be three of the addends.

Then $204 + 718 + 500 = 1422$.

From 6149

Take 1422

4727 = 4th addend.

(31)

74967

6943

68024

(32)

64009 } The minuend is equal to
7143 } the sum of the subtrahend
71152 } and the remainder, so we
add.

(33)

1727

917

2644

We add for the same reason as in question 32.

(34)

2007

1963

2614

From 9169

Take 6584

6584 = w'ght of the 3 loads. 2585 = w'ght of 4th load.

(35)

Let 1076 be one number.

From 9137

Take 1076

Rem. = 8061 = the 2nd number.

EXERCISE 9.

(20)

$$400007096 \times 11 = 4400078056.$$

EXERCISE 10.

(1)

719367

4

2879468

12

24553618

(4)

161714

4

646856

4

2587424

(2)

916704

7

6416928

12

77903136

(5)

71698

9

645282

9

5807538

(3)

714367

3

2143101

9

19287903

(6)

81897

11

900867

11

9909537

(7)

716914

12

8602968

12

103235616

(8)

167149

6

1002894

9

9026046

Exercise 10.]

KEY.

15

(9)

191878

6

1151268

7

8059878

(12)

765439

11

8419829

12

101037948

(15)

\$147

7

\$1029

7

\$7203

(18)

412 × 42

6

2472

7

17304 × 56

7

121128

8

969024

(10)

991476

8

7131808

8

57054464

(13)

604579 × 72

8

4838632

9

43529688

(16)

\$48

7

\$336

9

\$3024

(11)

918978

9

8270802

12

99249624

(14)

8968476 × 49

7

62779332

7

439455324

(17)

987

8

7896

10

78960

(19)

313 × 121

11

3443

11

37873

* 987 at \$90 each come to the same as 80 at \$987 each.

EXERCISE 11.

(1)

7191486

23

21574458

14382972

165404178

(2)

819715

898

8557720

7377425

4918280

572161070

(3)

6540910

8040

281636400

523272890

52588918400

0018

(4)

8491791

51008

67834328

8491791007

76426119

772820915328

(5)

814976

89

7334784

6518808

72592864

(6)

7819164

908

62553312

703724760

7099800912

(7)

7100867

8046

43145101

98763468

575269360

57857715882

(8)

28700046

90870

2899993220

229600368

2583064140

2607973180020

(9)

71400800
900708

571204800
4998042000

64260540000

64311091624800

(11)

91845067
900004

387388268
8266050080000

82660927680268

(13)

71476
9187

500332
571808
71476
648284

656650012

(10)

123456789
98067

804197523
740740734
9878543120

1111111101

12107036926863

(12)

9870643987
9060409

88835795993
394825758180
592238639230
888357958880

89432071618610683

(14)

91476
8190

8832840
91476
731808

74918844043

(15)

8100070

81009

73900630

810007000

64900560

656178570630

(17)

6307918

20790

567712620

44155426

126159360

131141615220

(16)

5858857

506007

41011999

3515314200

292942850

2964622653999

(18)

78486

20

1569720

7019

14127490

1569720

109880400

11017864680

(19) 00810

907

740

217

13

(28)

36280

6349

651

217

671180

2821

671180

2821

671180

1342360

5369440

1342360

1893398730

Exercises 11-13.]

KEY.

19

(20)	(21)	(22)
149	\$106	1149
229	217	83
1341	742	8447
293	106	9192
4321	212	
	\$23002	\$95367

(23)	(24)	(25)	(26)
360	97×17	183	23
320	17	53	47
7200	679	549	161
1080	97	915	92
115200	1649×304	9629	1081
	304	307	
	6596	67893	
	49470	290970	
	501296	2977593	

EXERCISE 12.

(25)	(26)	(27)	(28)
12) 200729711	7) 882	11) 746	12) 1932
1672743511	126	67	161

EXERCISE 13.

(1)	(2)
4) 714967	6) 100901
4) 178741-3	9) 83633-2
44685-1	3737-0
44685 $\frac{7}{16}$	3737 $\frac{3}{27}$
$1 \times 4 = 4$	$0 \times 3 = 0$
$4 + 3 = 7$	$0 + 2 = 2$

(3)

$$9)9186713$$

$$\begin{array}{r} 9)1020745-8 \\ \hline 113416-1 \\ \hline 113416 \end{array} \left. \begin{array}{l} 1 \times 9 = 9 \\ 8 + 8 = 17 \end{array} \right\} = 17$$

(4)

$$12)16151712$$

$$\begin{array}{r} 12)1845976-0 \\ \hline 112164-8 \\ \hline 112164 \end{array} \left. \begin{array}{l} 8 \times 12 = 96 \\ 96 + 0 = 96 \end{array} \right\} = 192$$

(5)

$$6)1671932$$

$$\begin{array}{r} 7)278055-2 \\ \hline 39807-6 \\ \hline 39807 \end{array} \left. \begin{array}{l} 6 \times 6 = 36 \\ 36 + 2 = 38 \end{array} \right\} = 44$$

(6)

$$9)22222222$$

$$\begin{array}{r} 12)2469135-7 \\ \hline 205761-3 \\ \hline 205761 \end{array} \left. \begin{array}{l} 3 \times 9 = 27 \\ 27 + 7 = 34 \end{array} \right\} = 34$$

(7)

$$11)617149324$$

$$\begin{array}{r} 11)56104484-0 \\ \hline 5100407-7 \\ \hline 5100407 \end{array} \left. \begin{array}{l} 7 \times 11 = 77 \\ 77 + 0 = 77 \end{array} \right\} = 77$$

(8)

$$10) 8182838485$$

$$\begin{array}{r} 10) 8182838485 \\ \hline 8182838485 \\ \hline 8182838485 \\ \hline 8182838485 \end{array} \left. \begin{array}{l} 8 \times 10 = 80 \\ 80 + 5 = 85 \end{array} \right\} = 105$$

(9)

$$8) 867788991$$

$$\begin{array}{r} 8) 867788991 \\ \hline 867788991 \\ \hline 10434202-7 \\ \hline 10434202-7 \\ \hline 10434202-7 \end{array} \left. \begin{array}{l} 7 \times 8 = 56 \\ 56 + 7 = 63 \end{array} \right\} = 81$$

(10)

$$6) 78998778998$$

$$\begin{array}{r} 9) 13166463166-2 \\ \hline 1463940351-7 \\ \hline 1463940351-7 \end{array} \left. \begin{array}{l} 7 \times 6 = 42 \\ 42 + 2 = 44 \end{array} \right\} = 11$$

(11)

$$10) 917048006 \div 110$$

$$\begin{array}{r} 11) 91704800-6 \\ \hline 8336800-0 \\ \hline 8336800-0 \end{array} \left. \begin{array}{l} 0 \times 10 = 0 \\ 0 + 6 = 6 \end{array} \right\} = 110$$

(12)

$$7) 70004019 \div 63$$

$$\begin{array}{r} 9) 10000574-1 \\ \hline 1111174-8 \\ \hline 1111174-8 \end{array} \left. \begin{array}{l} 8 \times 7 = 56 \\ 56 + 1 = 57 \end{array} \right\} = 11$$

B

(13)

$$411609 \times 79 = 32517111$$

$$7)32517111 \div 56$$

$$\begin{array}{r} 8)4645301-4 \\ \hline 580662-5 \\ \hline 580662\frac{1}{2} \end{array} \left. \begin{array}{l} 5 \times 7 = 35 \\ 35 + 4 = 39 \end{array} \right\} = 38$$

(14)

$$10)71496 \div 60$$

$$\begin{array}{r} 6)7149-6 \\ \hline 1191-3 \\ \hline 1191\frac{1}{2} \end{array} \left. \begin{array}{l} 3 \times 10 = 30 \\ 30 + 6 = 36 \end{array} \right\} = 38$$

(15)

$$7)918674 \div 56$$

$$\begin{array}{r} 8)131239-1 \\ \hline 16404-7 \\ \hline 16404\frac{1}{2} \end{array} \left. \begin{array}{l} 7 \times 7 = 49 \\ 49 + 1 = 50 \end{array} \right\} = 48$$

(16)

$$6)291717 \div 48$$

$$\begin{array}{r} 8)48619-3 \\ \hline 6077-3 \\ \hline 6077\frac{1}{2} \end{array} \left. \begin{array}{l} 3 \times 6 = 18 \\ 18 + 3 = 21 \end{array} \right\} = 21$$

(17)

$$6)1774 \div 48$$

$$\begin{array}{r} 8)295-4 \\ \hline 36-7 \\ \hline 36\frac{1}{2} \end{array} \left. \begin{array}{l} 7 \times 6 = 42 \\ 42 + 4 = 46 \end{array} \right\} = 46$$

$$36\frac{1}{2}$$

$$\begin{array}{r} (18) \\ 3)1280 \div 21 \\ \hline 7)420 \\ \hline 60 \end{array}$$

$$\begin{array}{l} (19) \\ 71496 \times 7 \times 17 = 8508024 \\ 6)8508024 \div 66 \end{array}$$

$$\begin{array}{l} 11)1418004-0 \quad \left. \begin{array}{l} 5 \times 6 = 30 \\ 30 + 0 = 30 \end{array} \right\} = 30 \\ \hline 128909-5 \\ \hline 128909 \end{array}$$

$$\begin{array}{l} (20) \\ 5)71498 \div 45 \end{array}$$

$$\begin{array}{l} 9)14299-3 \quad \left. \begin{array}{l} 7 \times 5 = 35 \\ 35 + 3 = 38 \end{array} \right\} = 38 \\ \hline 1588-7 \\ \hline 1588 \end{array}$$

EXERCISE 14.

$$(1) \quad 227)8916740(39280 \frac{1}{2}$$

$$\begin{array}{r} 681 \\ \hline \end{array}$$

$$\begin{array}{r} 2106 \\ \hline \end{array}$$

$$\begin{array}{r} 2043 \\ \hline \end{array}$$

$$\begin{array}{r} 637 \\ \hline \end{array}$$

$$\begin{array}{r} 454 \\ \hline \end{array}$$

$$\begin{array}{r} 1834 \\ \hline \end{array}$$

$$\begin{array}{r} 1816 \\ \hline \end{array}$$

$$\begin{array}{r} 169 \\ \hline \end{array}$$

$$(2) \quad 1116)8181413(7313 \frac{1}{116}$$

$$\begin{array}{r} 7812 \\ \hline \end{array}$$

$$\begin{array}{r} 3494 \\ \hline \end{array}$$

$$\begin{array}{r} 3348 \\ \hline \end{array}$$

$$\begin{array}{r} 1461 \\ \hline \end{array}$$

$$\begin{array}{r} 1116 \\ \hline \end{array}$$

$$\begin{array}{r} 3453 \\ \hline \end{array}$$

$$\begin{array}{r} 3348 \\ \hline \end{array}$$

$$\begin{array}{r} 105 \\ \hline \end{array}$$

24

KEY.

[ELEM. ARITH.]

(3)

2106)1498708(7111348
14742

2450

2106

3448

2106

1340

(5)

23)7142347(3105364

69

24

23

115

84

69

157

138

19

(7)

28161)8891876(31511181

84483

44357

28161

161966

140805

21161

(4)

8161)8222800(10074473
8161

61800

57127

4673

8161

100744

(6)

17)6171112(3630064

51

107

102

51

51

112

102

10

(8)

3344)1123344(3356

10032

11913

10032

18814

16720

20944

20064

880

(4)

800(10071473

10013

800

1127

1673

(6)

2(36300612

(11)

7x17x93=11067

11067)9167492(828 4016

88536

12377

02

10

9)344

344(33563346

3

2

14

20

944

064

880

(9)

81007)91929394(113447447 19123)19167123(100219177

81007

109223

81007

282169

243021

391484

324028

67456

(11)

7x17x93=11067

11067)9167492(828 4016

88536

31389

22134

92552

88536

4016

(10)

19123

44123

38246

5877

(12)

13x15x11=2145

2145)6149811(286779

4290

18598

17160

14381

12870

15111

15016

98

(13)

617 x 23 = 14191.

14191)8182700(576 884

70955

108720

99337

93830

85146

8684

(14)

27498765)2526426017008695(91874163

247488885

51537167

27498765

240384029

219990120

203939090

192491355

114477358

109995060

44822986

27498765

173242219

164992590

82496295

82496295

(15)

50406)405168300(8050

403248

252030

252030

(16)

538362)4984155396(9258

4845258

1388973

1076724

3122499

2691818

4306896

4306896

4163
119

$$\begin{array}{r} (17) \\ 723 \times 417 = 301491 \\ 917)301491(328\overline{)144} \\ \underline{2751} \end{array}$$

$$\begin{array}{r} 2639 \\ 1834 \\ \hline 8051 \\ 7336 \\ \hline 715 \end{array}$$

(19)

$$\begin{array}{r} (18) \\ 1476 \times 238 = 351288 \\ 91)351288(3860\overline{)34} \\ \underline{273} \end{array}$$

$$\begin{array}{r} 782 \\ 728 \\ \hline 548 \\ 546 \\ \hline 28 \end{array}$$

(20)

$$\begin{array}{r} 271 \times 777 = 210567 \\ 1027)210567(205\overline{)1617} \\ \underline{2054} \end{array}$$

$$\begin{array}{r} 5167 \\ 5135 \\ \hline 32 \end{array}$$

(21)

$$\begin{array}{r} 1271 \times 2986 = 3795206 \\ 407 \times 11 = 4477 \\ 4477)3795206(847\overline{)1147} \\ \underline{35816} \end{array}$$

$$\begin{array}{r} 21360 \\ 17908 \\ \hline 34528 \\ 31339 \\ \hline 3187 \end{array}$$

(22)

5396(9258
8
973
724
2499
1818
06896
06896

$$\begin{array}{r} 217)9142(42\overline{)217} \\ \underline{853} \\ 462 \\ \underline{434} \\ 28 \end{array}$$

$$\begin{array}{r} 798 = 35960 \text{ shillings.} \\ 3)35960(11986\overline{)13} \end{array}$$

$$\begin{array}{r} 344 \\ \hline 156 \\ 129 \\ \hline 270 \\ 258 \\ \hline 12 \end{array}$$

(24)

40690)8070000006(19832813333

40690

(23)

4017)27004009(87221333

24102

400100

366210

29020

338900

28119

325520

9010

133800

8034

122070

9789

117300

8034

81380

1735

358206

325520

33686

(25)

79410)704000001(886518111

835280

687200

635280

519200

476480

427401

397050

80351

(26)

29)877(2314

58

97

87

10

EXERCISE 15.

(1)

$$719 \times 400 = 287600$$

$$16 \times 20 = 320$$

$$19 \times 5 \div 12 = 7\frac{1}{2}$$

$$\underline{\$2879.27\frac{1}{2}}$$

(3)

$$167 \times 400 = 66800$$

$$41 \times 5 \div 12 = 17\frac{1}{4}$$

$$\underline{\$668.17\frac{1}{4}}$$

(5)

$$655 \times 400 = 262000$$

$$19 \times 20 = 380$$

$$35 \times 5 \div 12 = 14\frac{1}{4}$$

$$\underline{\$2623.94\frac{1}{4}}$$

(7)

$$111 \times 400 = 44400$$

$$11 \times 20 = 220$$

$$44 \times 5 \div 12 = 18\frac{1}{3}$$

$$\underline{\$446.38\frac{1}{3}}$$

(9)

$$57 \times 400 = 22800$$

$$8 \times 20 = 160$$

$$22 \times 5 \div 12 = 9\frac{1}{3}$$

$$\underline{\$229.69\frac{1}{3}}$$

(2)

$$671 \times 400 = 268400$$

$$12 \times 20 = 240$$

$$32 \times 5 \div 12 = 13\frac{1}{3}$$

$$\underline{\$2686.53\frac{1}{3}}$$

(4)

$$17 \times 400 = 6800$$

$$17 \times 20 = 340$$

$$30 \times 5 \div 12 = 12\frac{1}{2}$$

$$\underline{\$71.52\frac{1}{2}}$$

(6)

$$777 \times 400 = 310800$$

$$11 \times 20 = 220$$

$$12 \times 5 \div 12 = 5$$

$$\underline{\$3110.25}$$

(8)

$$567 \times 400 = 226800$$

$$8 \times 20 = 160$$

$$37 \times 5 \div 12 = 15\frac{1}{4}$$

$$\underline{\$2269.75\frac{1}{4}}$$

(10)

$$704 \times 400 = 281600$$

$$19 \times 20 = 380$$

$$47 \times 5 \div 12 = 19\frac{1}{4}$$

$$\underline{\$2819.59\frac{1}{4}}$$

EXERCISE '18.

(1)

\$719.40

\$917.10

$$\begin{aligned} \$719 \div 4 &= £179 + \$3 \\ 840 \text{ cents} \div 20 &= 17\text{s.} \\ £179 \text{ 17s.} \end{aligned}$$

$$\begin{aligned} \$917 \div 4 &= £229 + \$1 \\ 110 \text{ cts.} \div 20 &= 5\text{s.} + 10 \text{ cts.} \\ 10 \text{ cents} \times 3 \div 5 &= 6\text{d.} \end{aligned}$$

£229 5s. 6d.

\$69.70

$$\$69 \div 4 = £17 + \$1$$

\$417.95

$$\begin{aligned} 170 \text{ cts.} \div 20 &= 8\text{s.} + 10 \text{ cts.} \\ 10 \text{ cents} \times 3 \div 5 &= 6\text{d.} \\ £17 \text{ 8s. 6d.} \end{aligned}$$

$$\begin{aligned} \$417 \div 4 &= £104 + \$1 \\ 195 \text{ cts.} \div 20 &= 9\text{s.} + 15 \text{ cts.} \\ 15\text{c} \times 3 \div 5 &= 9\text{d.} \end{aligned}$$

£104 9s. 9d.

(2)

\$171.11

\$190.09

$$\begin{aligned} \$171 \div 4 &= £42 + \$3 \\ 311 \text{ cts.} \div 20 &= 15\text{s.} + 11\text{c.} \\ 11 \text{ cts.} \times 3 \div 5 &= 6\frac{1}{2}\text{d.} \\ £42 \text{ 15s. } 6\frac{1}{2}\text{d.} \end{aligned}$$

$$\begin{aligned} \$190 \div 4 &= £47 + \$2 \\ 209 \text{ cts.} \div 20 &= 10\text{s.} + 9 \text{ cts.} \\ 9\text{c.} \times 3 \div 5 &= 5\frac{1}{2}\text{d.} \\ £47 \text{ 10s. } 5\frac{1}{2}\text{d.} \end{aligned}$$

\$1674.23

\$777.77

$$\begin{aligned} \$1674 \div 4 &= £418 + \$2 \\ 223 \text{ c.} \div 20 &= 11\text{s.} + 3 \text{ c.} \\ 3 \times 3 \div 5 &= 1\frac{1}{2}\text{d.} \\ £418 \text{ 11s. } 1\frac{1}{2}\text{d.} \end{aligned}$$

$$\begin{aligned} \$777 \div 4 &= £194 + \$1 \\ 177 \text{ cents} \div 20 &= 8\text{s.} + 17\text{c.} \\ 17 \times 3 \div 5 &= 10\frac{1}{2}\text{d.} \\ £194 \text{ 8s. } 10\frac{1}{2}\text{d.} \end{aligned}$$

(3)

\$444.44

\$111.26

$$\begin{aligned} \$444 \div 4 &= £111 \\ 44 \div 20 &= 2\text{s.} + 4\text{c.} \\ 4 \times 3 \div 5 &= 2\frac{2}{5}\text{d.} \\ £111 \text{ 2s. } 2\frac{2}{5}\text{d.} \end{aligned}$$

$$\begin{aligned} \$111 \div 4 &= £27 + \$3 \\ 326 \text{ cents} \div 20 &= 16\text{s.} + 6\text{c.} \\ 6\text{c} \times 3 \div 5 &= 3\frac{3}{5}\text{d.} \\ £27 \text{ 16s. } 3\frac{3}{5}\text{d.} \end{aligned}$$

\$70.07

\$191.82

$$\begin{aligned} \$70 \div 4 &= £17 + \$2 \\ 207\text{c} \div 20 &= 10\text{s.} + 7\text{c.} \\ 7\text{c} \times 3 \div 5 &= 4\frac{1}{5}\text{d.} \\ £17 \text{ 10s. } 4\frac{1}{5}\text{d.} \end{aligned}$$

$$\begin{aligned} \$191 \div 4 &= £47 + \$3 \\ 382\text{c.} \div 20 &= 19\text{s.} + 2\text{c.} \\ 2\text{c} \times 3 \div 5 &= 1\frac{1}{5}\text{d.} \\ £47 \text{ 19s. } 1\frac{1}{5}\text{d.} \end{aligned}$$

(4)

$$\begin{array}{ll} \$714.23 & \$21.17 \\ \$714 \div 4 = £178 + \$2 & \$21 \div 4 = £5 + \$1 \\ 223c \div 20 = 11s. + 3c & 117c \div 20 = 5s. + 17c. \\ 3c \times 3 \div 5 = 1\frac{1}{5}d. & 17 \times 3 \div 5 = 10\frac{1}{5}d. \\ \underline{\pounds 178 \ 11s. \ 1\frac{1}{5}d.} & \underline{\$5 \ 5s. \ 10\frac{1}{5}d.} \end{array}$$

$$\begin{array}{ll} \$16.16 & £7934.98 \\ \$16 \div 4 = £4 & £7934 \div 4 = £1983 + \$2 \\ 16c \div 20 = 0s. + 16c & 298c \div 20 = 14s. + 18c \\ 16c \times 3 \div 5 = 9\frac{1}{5}d. & 18c \times 3 \div 5 = 10\frac{1}{5}d. \\ \underline{\pounds 4 \ 0s. \ 9\frac{1}{5}d.} & \underline{\pounds 1983 \ 14s. \ 10\frac{1}{5}d.} \end{array}$$

EXERCISE 17.

(1)

$$\begin{array}{r} \$749.86 \\ 614.91 \\ 9167.14 \\ 918.40 \\ 21.74 \\ 614.29 \\ 29.78 \\ \hline \$12116.12 \end{array}$$

(2)

$$\begin{array}{r} \$888.77 \\ 918.68 \\ 1147.98 \\ 91867.42 \\ 1919.19 \\ 981.92 \\ 444.59 \\ \hline \$98166.53 \end{array}$$

(3)

$$\begin{array}{r} £9 \ 8s. \ 7\frac{1}{5}d. = \$37.72\frac{1}{5} \\ \$617.49 \\ 74.27 \\ 23.33 \\ 57.72\frac{1}{5} \\ \hline \$752.80\frac{1}{5} \end{array}$$

(4)

$$\begin{array}{r} \$6714.98 \\ 982.49 \\ \hline \$5732.49 \end{array}$$

(5)

$$\begin{array}{r} \$4216.23 \\ 2437.86 \\ \hline \$1778.37 \end{array}$$

(6)

$$\begin{array}{r} £471 \ 16s. \ 10\frac{1}{5}d. = \$1887.37\frac{1}{5} \\ \$1887.37\frac{1}{5} \\ 914.71 \\ \hline \$972.66\frac{1}{5} \end{array}$$

(7)

$$\begin{array}{r} £29 \ 18s. \ 9d. = \$119.75 \\ \$649.82 \\ 119.75 \\ \hline \$529.57 \end{array}$$

(8)

$$\begin{array}{r} \$671.31 \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} \$2684.84 \\ \hline \end{array}$$

12

$$\begin{array}{r} \$32218.08 \\ \hline \end{array}$$

(9)

$$\begin{array}{r} \$519.28 \\ \hline \end{array}$$

789

$$\begin{array}{r} 467334 \\ \hline \end{array}$$

415408

383482

$$\begin{array}{r} \$409696.14 \\ \hline \end{array}$$

(10)

$$\begin{array}{r} \$18.83 \\ \hline \end{array}$$

529

15147

3366

8415

$$\begin{array}{r} \$8903.07 \\ \hline \end{array}$$

(11)

$$\begin{array}{r} \$6149.73 \div 67 \\ \hline \end{array}$$

$$= 614973 \text{ cents} \div 67.$$

$$67) \$6149.73 (\$91.7817$$

803

119

67

527

469

583

536

47

(12)

$$149) \$18793.67 (\$126.1317$$

149

389

298

913

894

196

149

477

447

30

(13)

$$\begin{array}{r} \$1714.86 \div \$71.42 = 171486 \text{ cents} \div 7142 \text{ cents.} \\ \hline \end{array}$$

$$7142) 171486 (24.14$$

14284

28646

28668

78

(10)

\$18.83

529

15147

3366

8415

\$8903.07

(11)

\$9167.42 + \$147.83 = 916742 cents + 14783 cents.

14783 916742 (62, 14783)

88698

29762

29566

196

(14)

(15)

\$147.80

217.20

63.27

23.87

\$452.14

(16)

3) \$916.74 ÷ 27

9) 305.58 - 0

\$33.95 - 3

\$33.95₇

3 × 3 = 9
9 + 0 = 9

(17)

\$671.90 + 13 =

67190 cents ÷ 13

13) 67190 (5168₁ cts. =

65

\$51.68₁

21

13

89

78

110

104

6

(18)

£71 16s. 7½d = \$287.32½

\$17.80

21.63

123.76

37.26

Sum = \$200.45

From 287.32½

Take 200.45

\$86.87½ = Remainder

(19)

\$1745 × 17

37665

12215

1745

\$29665

(20)

\$73380

29742

\$42644 × 63

9

383796

7

217) \$26865.72 (\$123.80117

217

516

434

825

651

1747

1736

112

(21)

\$314823

718298

9447727

2462765

7904400

325376

112538

1443044

\$22728969

(22)

\$29078527

22728969

\$6349558

(23)

2954600) 329078527 (39-84-53-193

26591400

12344700

24871270

11811400

23636800

526300

EXERCISE 18.

(1)

$47 \times 128 = 6016$

(2)

$6497 \times 16 = 103952$

(3)

£97 16s. 8½d. acres. roods. per. yds. ft. in.
20 137 2 17 19 8 121

4

1956

12

510

40

23480

4

20417

304

93982

612529

5104½

617633½ yds. = 617633 yds. ft. in.

Add

2

36

8

121

617634

2

13

9

5558708

144

22234845

22234857

5558708

800453965

(5)

tons	cwt.	grs.	lbs.	oz.	drs.
------	------	------	------	-----	------

569	4	3	17	4	7
-----	---	---	----	---	---

20

11384

4

45539

25

227712910781138492

16

6830956113849218213876

16

10929526318215876291454023

(6)

Pipes hhds. brl. gal. qts.

4	1	1	19	12
---	---	---	----	----

2

9

2

19

31

38

57

9

617

4

2472 qts.

drs.

7

(7)

Miles. far. per. yds. ft. in.

17 7 7 2 2 4

8

143

40

5727

5

28637

2863

31500

3

94503

12

1184046

12

13608552 lines.

5°

60

317

60

19069 sec.

(8)

17° 49'

(9)

Ch. bush. pks. gal. qt.

2 17 2 1 1

36

89

4

358

2

717

4

2869

2

5738 pts.

(10)

(11)

Fr. ells. qr. na. in.	Weeks. days. hrs. m. sec.
9	17
6	4
—	9
55	29
4	17
—	7
223	123
24	24
—	—
503 in.	501
	246
	—
	2961
	60
	—
	177689
	60
	—
	10661357

(12)

(13)

E. \$ d. c. m.	lbs. oz. dwt. grs.
29 9 6 2 4	7 9 16 11
299624	12
	—
	218
	20
	—
	4276
	24
	—
	17115
	8552
	—
	102635 grs.

rs. m. sec.

9 29 17

(14)

Cub. yds. cub. ft. cub. in.

37	9	1111
27		
<hr/>		
368		
74		
<hr/>		
1008		
1728		
<hr/>		
9175		
2016		
7056		
1008		
<hr/>		
1742935 cub. in.		

(15)

lb. oz. scr. grs.

129	4	2	11
12			
<hr/>			
1552			
8			
<hr/>			
12416			
3			
<hr/>			
37250			
20			
<hr/>			
745011 grs.			

grs.

11

(16)

Per.

127	
364	
<hr/>	
3810	
314	
<hr/>	
38414	
9	
<hr/>	
34575½ = 34575 ft. 108 in.	

(17)

E. ell. qr. na.

127	1	2
5		
<hr/>		
636		
4		
<hr/>		
2546		
2½		
<hr/>		
5092		
636½		
<hr/>		
5728½ in.		

40

KEY.

[ELEM. ARITH.]

(18)

C. cub. ft.

17 63

128

199

34

17

2239 cub. ft.

(19)

gal.

 $714 \times 4 = 2856$ qts.

(20)

lbs. oz. drs.

71 11 3

12

863

8

6907

3

20721

(21)

cwt. qr. lbs.

16 1 19

4

65

25

344

130

1644

16

9864

1644

26304 oz.

(22)

mls. ft.

11 2

8

88

40

3520

5½

17600

1760

19360

3

58082

12

696984 in.

(23)

acres. per.

123 17

4

492

40

19697

30½

590910

4924½

595834½sq.yds.

Exercise 18.]

KEY.

41

(20)

oz. drs.

11 3

9)

per.

17

sq.yds.

(24)

hrs. days. min. days. hrs.

27 16 4

3654

151

162

81

64

98774

24

39508

19754

18

237066

60

14223964

60

853437840 sec.

(25)

161 14

24

658

322

3878 hrs.

(27)

bush. pk. gal.

17 1 1

4

69

2

139

4

556

2

1112 pts.

(26)

£1978 17s. 9d.

20

39577

12

474933

4

1899734 far.

(28)

lbs. dwt.

9 17

12

108

20

2177

24

8708

4354

52248

(29)

sq. m. a. yds.

9 1 9

640

5761

4

23044

40

921780

304

27652809

230440

27883249

9

250949241

144

1003796964

1003796964

250949241

36136690704 sq. in.

(30)

£171 11s. 14d.

20

3431

12

41173

4

164095 far.

s. 14d.

EXERCISE 19.

(1)

112)71889

3)5999 ft. 1 in.

54)1999 yds. 2 ft. 1 in.

2)2

11)8998

40)363 per. 24 yds. 2 ft. 1 in.

4)9 fur. 3 per. 3 yds. 0 ft. 7 in.

2 m. 1 fur. 3 per. 3 yds. 0 ft. 7 in.

(2)

60)6142 min.

24)102 hrs. 22 min.

4 d. 6 h. 22 m.

(3)

20)81427 gra.

3)4071 scr. 7 gra.

8)1357 drs. 0 scr. 7 gra.

12)169 oz. 5 drs. 7 gra.

14 lbs. 1 oz. 5 drs. 7 gra.

(4)

1728)9141762 cub. in.

16)5290 cub. ft. 642 cub. in.

8)330 cord ft. 10. cub. ft. 642 cub. in.

41 c. 2 c. ft. 10. cub. ft. 642 cub. in.

(5)

(01)

(6)

2)71777 pts.

27)914 cub. ft.

4)35888 qts. 1 pt.

23 cub. yds. 23 cub. ft.

2)8972 gals. 1 pt.

4)4486 pk. 1 pt.

36)1121 bush. 2 pk. 1 pt.

31 ch. 5 bush. 2 pk. 1 pt.

(7)

(8)

24 81479 inches.

7)89 days.

4)12214

12 weeks 5 days.

9)245916

4)27324 na.

6)6831 qrs.

1138 French ells 3 qrs.

(9)

16)1714064 drama.

16)107185 oz. 4 drs.

25)6699 lbs. 1 oz. 4 drs.

4)267 qrs. 24 lbs. 1 oz. 4 drs.

20)66 cwt. 3 qrs. 24 lbs. 1 oz. 4 drs.

3 tons 6 cwt. 3 qrs. 24 lbs. 1 oz. 4 drs.

(10)

144)1714961 inches.

9)11909 ft. 65 in.

304 1323 yds. 2 ft. 65 in.
4 4

121) 5292

43 sq. per. 89 qr. yds. 2 ft. 65 in. =

40)43 sq. per. 22 yds. 4 ft. 101 in.

1 rood 3 per. 12 yds. 4 ft. 101 in.

(11)

4)171439 qts.

31 1/2 42859 gal. 3 qts.
2 1/2 112

63) 85718

2)1360 bar. 38 half-gal. 3 qts.

2)680 hhds. 19 gal. 3 qts.

2)340 pi. 19 gal. 3 qts.

170 tuns 19gal. 3 qts.

(12)

60)171491642 sec.

60)2858194 min. 2 sec.

24)47636 hrs. 34 min. 2 sec.

365 1/4 1984 dys. 20 hrs. 34 m. 2 sec.
4 4

1461) 7936

5 yrs. 631 qr. dys. 20 hrs. 34 m. 2 sec.

= 5 yrs. 157 1/2 dys. 20 hrs. 34 m. 2 sec.

= 5 yrs. 158 dys. 14 hrs. 34 m. 2 sec.

days.

(13)

(14)

4)171496894 far.

10)2987149 mills.

12)42874223 1/2 d.

10)298714 c. 9 mills.

20)3572851 shil. 11 1/2 d.

20)29871 d. 4 c. 9 mills.

2178642 11s. 11 1/2 d.

10)29873 1d. 4 c. 9 mills.

298E. 73 1d. 4c. 9 mills.

(15)

144)21111496 inches.

9)148807 ft. 88 in.

30 1/2 16289 yds. 6 ft. 88 in.

4

4

121) 65156

538 per. 58 qr. yds. 6 ft. 88 in.

538 per. 14 1/2 yds. 6 ft. 88 in.

40)538 per. 15 yds. 2 ft. 16 in.

4)18 reeds 18 per. 15 yds. 2 ft. 16 in.

3 a. 1 r. 18 per. 15 yds. 2 ft. 16 in.

(16)

(17)

128)17498 cub. ft.

12)919817 pence

136 c. 90 cub. ft.

20)78351 shil. 5d.

23832 11s. 5d.

(18)

(19)

20)999 dwt.

2)1771 gal.

12)49 oz. 10 dwt.

4)885 pk. 1 gal.

4 lb. 1 oz. 10 dwt.

321 bus. 1 pk. 1 gal.

(20) (21)

2) 91886 Fl. ells. 35) 17149 lbs.

45833 Fr. ells. 4) 685 grs. 24 lbs.

60) 171 cwt. 1 qr. 24 lbs.

8 tons 11 cwt. 1 qr. 24 lbs.

60) 171 cwt. 1 qr. 24 lbs. (23)

3) 17110 ft.

60) 1111111 sec.

54) 5703 yds. 1 ft.

60) 18518 min. 21 sec.

2 2

308 deg. 38 m. 31 sec.

11 11408

40) 1036 per. 5 yds. 1 ft.

8) 25 fur. 36 per. 5 yds. 1 ft.

3 m. 1 fur. 36 per. 5 yds. 1 ft.

(24)

1728) 667789 cub. in.

27) 386 cub. ft. 781 cub. in.

14 cub. yds. 8 cub. ft. 781 cub. in.

(25)

20) 7891427 grs.

3) 394571 scr. 7 grs.

8) 131523 drs. 2 scr. 7 grs.

12) 16440 oz. 3 drs. 2 scr. 7 grs.

1370 lbs. 0 oz. 3 drs. 2 scr. 7 grs.

(26)

24) 878846 grs.

20) 28285 dwt. 6 grs.

12) 1414 oz. 5 dwt. 6 grs.

117 lbs. 10 oz. 5 dwt. 6 grs.

(27)

16) 298714 drams.

16) 18669 oz. 10 drs.

25) 1188 lbs. 13 oz. 10 drs.

4) 48 qrs. 18 lbs. 13 oz. 10 drs.

1 cwt. 2 qrs. 16 lbs. 13 oz. 10 drs.

(28)

144) 61479887 inches.

9) 426943 ft. 75 in.

304) 47438 yds. 1 ft. 75 in.

121 189752

40) 1568 per. 6 yds. 1 ft. 75 in.

4) 39 r. 8 per. 6 yds. 1 ft. 75 in.

9 a. 3 r. 8 per. 6 yds. 1 ft. 75 in.

(29)

5) 91999 yds.

2 2

11) 183998

40) 16727 per. 1 half yd.

8) 416 fur. 7 per. 1 ft. 6 in.

3) 52 m. 2 fur. 7 per. 1 ft. 6 in.

17 lea. 1 m. 2 fur. 7 per. 1 ft. 6 in.

(30)

12) 714986 in.

6) 59582 ft. 2 in.

9930 fathoms 2 ft. 2 in.

EXERCISE 23.

(1)

£74 19 4 1/2 x 16

4

299 17 7

4

£1199 10 4

(3)

Days hrs. min.

16 4 17 x 21

3

48 12 51

7

339 17 57

(2)

lbs. oz. dwt.

75 4 7 x 18

3

228 1 1

6

1356 6 6

(4)

Fl. ells. qrs. na.

37 2 1 x 35

5

188 2 1

7

1321 0 32

(5)

m. fur. per.

$$\begin{array}{r} 63 \quad 4 \quad 7 \times 56 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 508 \quad 1 \quad 16 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 3557 \quad 1 \quad 32 \end{array}$$

(7)

hrs. min. sec.

$$\begin{array}{r} 43 \quad 19 \quad 36 \times 84 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 303 \quad 17 \quad 12 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 3639 \quad 26 \quad 24 \end{array}$$

(9)

oz. drs. scr. grs.

$$\begin{array}{r} 91 \quad 6 \quad 2 \quad 19 \times 121 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 1010 \quad 4 \quad 2 \quad 9 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 11116 \quad 4 \quad 2 \quad 19 \end{array}$$

(11)

per. yds. ft.

$$\begin{array}{r} 115 \quad 4 \quad 7 \times 144 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 1381 \quad 26 \frac{1}{2} \quad 3 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 16582 \quad 22 \frac{1}{2} \quad 0 \end{array}$$

$$= 16582 \quad 22 \quad 4 \text{ ft. } 72 \text{ in.}$$

(6)

gal. qts. pts.

$$\begin{array}{r} 71 \quad 2 \quad 1 \times 77 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 501 \quad 1 \quad 1 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 5515 \quad 0 \quad 1 \end{array}$$

(8)

a. r. per.

$$\begin{array}{r} 16 \quad 3 \quad 17 \times 108 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 151 \quad 2 \quad 33 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 1820 \quad 1 \quad 36 \end{array}$$

(10)

$$\begin{array}{r} £116 \text{ } 11\text{s. } 11\frac{1}{2}\text{d. } \times 42 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 699 \quad 11 \quad 7\frac{1}{2} \\ \hline 7 \end{array}$$

$$\begin{array}{r} 4897 \quad 1 \quad 4\frac{1}{2} \end{array}$$

(12)

cwt. qrs. lbs.

$$\begin{array}{r} 93 \quad 3 \quad 17 \times 99 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 845 \quad 1 \quad 3 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 9298 \quad 0 \quad 8 \end{array}$$

= 8

bu

12

75

680

per

74

448

4494

44942

(13)

yrs.	days.	hours.	
16	110	11	$\times 50$
		10	
<hr/>			
163	84	14	
		5	
<hr/>			
815	434	22	
= 815	44	4	

(14)

c.yds.	c.ft.	c.in.	
29	17	1110	$\times 48$
		4	
<hr/>			
118	16	984	
		12	
<hr/>			
1423	9	1440	

(15)

bus.	pk.	gal.	qt.	pt.	
126	0	0	1	1	$\times 54$
				6	
<hr/>					
756	1	0	1	0	
				9	
<hr/>					
6806	3	0	1	0	

(16)

£27	16s.	0d.	$\times 100$
		10	
<hr/>			
278	0	7	
		10	
<hr/>			
£22780	6	3	

(17)

per.	yds.	ft.	in.	
74	4	2	11	$\times 600$
			6	
<hr/>				
449	14	2	6	
			10	
<hr/>				
4494	1	1	0	
			10	
<hr/>				
44942	2	1	0	

(18)

hrs.	min.	sec.	
93	17	57	$\times 1100$
		10	
<hr/>			
932	59	30	
		10	
<hr/>			
9329	55	0	
		11	
<hr/>			
102629	5	0	

(19)

(20)

a. r. per. yds.

5	2	7	9 × 560	£63	14s.	9½d.	× 8100
			7			10	

38	3	11	2½	637	7	11
			8			10

310	2	8	20	6373	19	2
			10			9

3105	2	6	18½	57365	12	6
						9

£510290	12	6
---------	----	---

3105 a. 2r. 6 per. 18 yds. 4 ft. 72 in.

EXERCISE 24.

(1)

$$718 = 700 + 10 + 8$$

bush.	pk.	gal.	qt.		bush.	pk.	gal.	qts.
-------	-----	------	-----	--	-------	-----	------	------

4	1	0	1 × 8 =	34	1	0	0
			10				

42	3	0	2 × 1 =	42	3	0	2
			10				

428	0	1	0 × 7 =	2996	3	1	0
-----	---	---	---------	------	---	---	---

3073	3	1	2
------	---	---	---

(2)

$$867 = 800 + 60 + 7$$

$$\begin{array}{r} £16 \quad 14s. \quad 11\frac{1}{2}d. \\ \times 7 \\ \hline \end{array} = \begin{array}{r} £117 \quad 4s. \quad 6\frac{1}{2}d. \end{array}$$

$$\begin{array}{r} 167 \quad 9 \quad 4\frac{1}{2} \\ \times 6 \\ \hline \end{array} = \begin{array}{r} 1004 \quad 16 \quad 3 \end{array}$$

$$\begin{array}{r} 1674 \quad 13 \\ \times 8 \\ \hline \end{array} = \begin{array}{r} 13397 \quad 10 \quad 0 \end{array}$$

$$\begin{array}{r} £14519 \quad 10 \quad 9\frac{1}{2} \end{array}$$

(3)

$$263 = 200 + 60 + 3$$

dys.	hrs.	min.		dys.	hrs.	min.
9	4	17	$\times 3 =$	27	12	51

$$\begin{array}{r} 912 \quad 18s. \quad 50 \\ \times 6 \\ \hline \end{array} = \begin{array}{r} 5502 \quad 17s. \quad 0 \end{array}$$

$$\begin{array}{r} 917 \quad 20 \\ \times 2 \\ \hline \end{array} = \begin{array}{r} 1835 \quad 16 \quad 40 \end{array}$$

$$\begin{array}{r} 2413 \quad 22 \quad 31 \end{array}$$

(4)

$$83 = 80 + 3$$

yds.	ft.	in.		yds.	ft.	in.
47	2	7	$\times 3 =$	143	1	9

$$\begin{array}{r} 478 \quad 1 \quad 10 \\ \times 8 \\ \hline \end{array} = \begin{array}{r} 3828 \quad 2 \quad 8 \end{array}$$

$$\begin{array}{r} 3972 \quad 1 \quad 5 \end{array}$$

D

(5)

$$197 = 100 + 90 + 7$$

lbs.	oz.	dwt.		lbs.	oz.	dwt.
6	4	7	$\times 7 =$	44	8	9
		10				

63	7	10	$\times 9 =$	572	7	10
		10				

636	3	0	$\times 1 =$	636	3	0
-----	---	---	--------------	-----	---	---

1253	4	19
------	---	----

(6)

$$985 = 900 + 80 + 5$$

a.	r.	p.	yd.	ft.		a.	r.	p.	yd.	ft.
7	0	4	0	3	$\times 5 =$	35	0	20	1	6
				10						

70	1	0	3	3	$\times 8 =$	562	0	0	26	6
				10						

702	2	1	2	3	$\times 9 =$	6322	2	9	27	0
-----	---	---	---	---	--------------	------	---	---	----	---

6919	2	30	25	3	$=$
------	---	----	----	---	-----

6919	a.	2	r.	30	per.	25	yds.	7	ft.	7	in.
------	----	---	----	----	------	----	------	---	-----	---	-----

(7)

$$1149 = 1000 + 100 + 40 + 9$$

yds.	qr.	na.		yds.	qr.	na.
16	3	1	$\times 9 =$	151	1	1
		10				

168	0	2	$\times 4 =$	672	2	0
		10				

1681	1	0	$\times 1 =$	1681	1	0
		10				

16812	2	0	$\times 1 =$	16812	2	0
-------	---	---	--------------	-------	---	---

19317	2	1
-------	---	---

Exercise 14.

KEY.

55

(8)

$$6472 = 6000 + 400 + 70 + 2$$

oz.	drs.	scr.	grs.		oz.	drs.	scr.	grs.
23	7	2	10	$\times 2 =$	47	7	2	12
			10					

239	7	1	0	$\times 7 =$	1679	3	1	0
			10					

2399	1	1	0	$\times 4 =$	9596	5	1	0
			10					

23991	5	1	0	$\times 6 =$	143950	0	0	0
					155274	0	1	12

(9)

$$8298 = 8000 + 200 + 90 + 8$$

£9	11s.	4d.	$\times 8 =$	£76	10s.	10d.
		10				

95	13	6 $\frac{1}{2}$	$\times 9 =$	861	1	10 $\frac{1}{2}$
		10				

956	15	5	$\times 2 =$	1913	10	10
		10				

9567	14	2	$\times 8 =$	76541	13	4
				£79392	16	10 $\frac{1}{2}$

(10)

$$67 = 60 + 7$$

cwt.	qr.	lbs.		cwt.	qr.	lbs.
73	1	16	$\times 7 =$	513	3	12
		10				

734	0	10	$\times 6 =$	4404	2	10
				4918	1	22

(11)

$$647 = 600 + 40 + 7$$

m.	fur.	per.	yd.	ft.	in.	m.	fur.	per.	yd.	ft.	in.
7	4	16	2	2	6	52	6	35	2	2	6
10											

75	4	5	1	0	0	302	0	20	3	1	0
10											

755	1	11	2	1	0	4530	7	29	1	0	0
-----	---	----	---	---	---	------	---	----	---	---	---

4885	7	5	1	0	8
------	---	---	---	---	---

= 4885	7	5	1	2	0
--------	---	---	---	---	---

(12)

$$217 = 200 + 10 + 7$$

E.	ells.	qr.	na.	in.	E.	ells.	qr.	na.	in.
17	4	2	1	0	125	2	1	0	1
10									

179	1	0	1	0	1	179	1	0	1
10									

1792	1	0	1	0	3584	2	0	2
------	---	---	---	---	------	---	---	---

3584	0	2	1
------	---	---	---

(13)

$$982 = 900 + 80 + 2$$

cwt.	qrs.	lbs.	oz.	drs.	cwt.	qrs.	lbs.	oz.	drs.
6	1	17	4	7	12	3	9	8	14
10									

64	0	22	12	6	513	3	7	3	0
10									

642	1	2	11	12	5780	1	24	9	12
-----	---	---	----	----	------	---	----	---	----

6370	0	16	5	10
------	---	----	---	----

(14)

$$2345 = 2000 + 300 + 40 + 5$$

a.	r.	p.	yd.	ft.	in.	a.	r.	p.	yd.	ft.	in.
8	2	14	17	16	117	42	3	32	28	2	81
10											

$$\times 5 =$$

85	3	25	26	2	126	343	2	23	14	4	108
10											

$$\times 4 =$$

859	0	18	21	1	108	2577	1	16	3	0	108
10											

$$\times 3 =$$

8591	0	26	30	4	0	17182	1	13	30	5	108
10											

$$\times 2 =$$

$$20146 \quad 1 \quad 6 \quad 16 \quad 0 \quad 45$$

(15)

$$567 = 500 + 60 + 7$$

ys.	dys.	hrs.	min.	sec.	ys.	dys.	hrs.	min.	sec.
11	217	23	47	18	81	64	22	31	6
10									

$$\times 7 =$$

115	352	20	53	0	695	295	5	18	0
10									

$$\times 6 =$$

1159	248	16	50	0	5798	148	12	10	0
10									

$$\times 5 =$$

6575	143	17	59	6
$= 6575 \quad 144 \quad 11 \quad 59 \quad 6$				

(16)

$$103 = 100 + 3$$

c.	c.	ft.	cub.ft.	c.	c.	ft.	cub. ft.
2	7	14	14	8	7	10	
10							

$$\times 3 =$$

27	6	12	12	298	3	8
10						

$$\times 10 =$$

$$307 \quad 3 \quad 2$$

(17)

$$3218 = 3000 + 200 + 10 + 8$$

bush. pk. gl. qt. pt.

bush. pk. gl. qt.

$$\begin{array}{r} 7 \ 1 \ 1 \ 1 \ 1 \times 8 = 59 \ 1 \ 1 \ 0 \\ 10 \end{array}$$

$$\begin{array}{r} 74 \ 0 \ 1 \ 3 \ 0 \times 1 = 74 \ 0 \ 1 \ 3 \\ 10 \end{array}$$

$$\begin{array}{r} 742 \ 0 \ 1 \ 2 \ 0 \times 2 = 1484 \ 1 \ 1 \ 0 \\ 10 \end{array}$$

$$\begin{array}{r} 7421 \ 3 \ 1 \ 0 \ 0 \times 3 = 22265 \ 2 \ 1 \ 0 \\ 10 \end{array}$$

$$23883 \ 2 \ 0 \ 3$$

(18)

$$975 = 900 + 70 + 5$$

lbs. oz. dr. scr. gra.

lbs. oz. dr. scr. gra.

$$\begin{array}{r} 67 \ 4 \ 6 \ 1 \ 11 \times 5 = 336 \ 11 \ 3 \ 1 \ 15 \\ 10 \end{array}$$

$$\begin{array}{r} 673 \ 10 \ 7 \ 0 \ 10 \times 7 = 4717 \ 4 \ 2 \ 0 \ 10 \\ 10 \end{array}$$

$$\begin{array}{r} 6739 \ 11 \ 7 \ 2 \ 0 \times 7 = 60851 \ 8 \ 5 \ 0 \ 0 \\ 10 \end{array}$$

$$65706 \ 0 \ 2 \ 2 \ 5$$

(19)

$$730 = 700 + 30$$

£ 174 16s. 0½d.

10

$$\begin{array}{r} 1748 \ 0 \ 21 \times 8 = £13984 \ 1 \ 8 \\ 10 \end{array}$$

$$\begin{array}{r} 17480 \ 2 \ 1 \times 7 = 122360 \ 14 \ 7 \\ 10 \end{array}$$

$$£136344 \ 16 \ 3$$

(20)

$$359 = 300 + 50 + 9$$

lbs.	oz.	dwt.	grs.		lbs.	oz.	dwt.	grs.
23	11	16	11	$\times 9 =$	215	10	8	3
			10					

239	10	4	14	$\times 5 =$	1199	3	2	22
			10					

2398	6	5	20	$\times 3 =$	7195	8	17	12
					8610	8	8	13

EXERCISE 25.

(11)

$$24 = 2 \times 12$$

$$2) \text{ £198 } 7\text{s. } 8\text{d.}$$

$$12) 98 \text{ } 3 \text{ } 10$$

$$\text{£8 } 3 \text{ } 7\frac{1}{2}$$

(12)

$$35 = 7 \times 5$$

fur.	per.	yds.	ft.	in.
7)149	17	4	0	0

5)21	3	5	0	10..2 rem.	} 4 \times 7 = 28
4	10	4	0	12..4 rem.	
					} 28 + 2 = 30
					= 4 fur. 10 per. 4 yds. 1 ft. 0\frac{1}{2} in.

(13)

$$81 = 9 \times 9$$

hrs. min. sec.

$$9)1476 \quad 47 \quad 16$$

$$9)164 \quad 25 \quad 15..1 \text{ rem.}$$

$$18 \quad 16 \quad 8..3 \text{ rem.}$$

$$3 \times 9 = 27 + 1 = 28 = \text{true rem.}$$

$$18 \text{ hrs. } 16 \text{ min. } 8\frac{1}{4} \text{ sec.}$$

(14)

$$108 = 9 \times 12.$$

lbs. oz. dwt.

$$9)1890 \quad 7 \quad 12$$

$$12)210 \quad 9 \quad 16 \quad 21..3 \text{ rem.}$$

$$17 \quad 6 \quad 1 \quad 9..9 \text{ rem.}$$

$$9 \times 9 = 81 + 3 = 84 = \text{true rem.}$$

$$17 \text{ lbs. } 6 \text{ oz. } 1 \text{ dwt. } 9\frac{1}{4} \text{ grs.}$$

(15)

$$132 = 11 \times 12$$

sq. per. yds. ft. in.

$$11)679 \quad 0 \quad 7 \quad 107$$

$$12)81 \quad 22 \quad 0 \quad 101..4 \text{ rem.}$$

$$5 \quad 4 \quad 3 \quad 35..5 \text{ rem.}$$

$$5 \times 11 = 55 + 4 = 59 \text{ true rem.}$$

$$5 \text{ sq. per. } 4 \text{ yds. } 3 \text{ ft. } 35\frac{1}{2} \text{ in.}$$

(16)

$$72 = 6 \times 12$$

qrs.	lbs.	oz.	drs.
6)3	19	11	7

$$12)15 \quad 12 \quad 9.1 \text{ rem.}$$

$$1 \quad 5 \quad 0.9 \text{ rem.}$$

$$9 \times 6 = 54 + 1 = 55$$

$$1 \text{ lb. } 5 \text{ oz. } 0\frac{1}{2} \text{ dr.}$$

(17)

$$144 = 12 \times 12$$

qrs.	days.	hrs.	min.	sec.
12)1167	119	11	0	0

$$12)97 \quad 101 \quad 4 \quad 55 \quad 0$$

$$8 \quad 38 \quad 20 \quad 24 \quad 35$$

(18)

oz.	drs.	scrs.	grs.	oz.	drs.	scrs.	grs.
97)987	7	1	16	(10	1	1	887

97

17

8

143

97

46

3

139

97

42 scr.

42 scr.

20

856

776

80

(19)

roods. per. ft. in. roods. per. yd. ft. in.

117) 1679 4 7 96 (14 14 1 5 8194

117

500

468

41

40

1644

117

474

468

6

501

1814

117

644

9

5874

586

24

144

456

351

105

(20)

wks. dys. hram. sec. wks. dys. hr. m. sec.
916) 7967 4 0 0 17 (8 4 21 18 4311.

7328

639

7

4477

3664

313

24

19512

1832

1192

916

276

60

16560

916

7400

7328

72

60

4337

2664

673

(21)

117) £98749 18s 11½d (£826 18s 5d 1944ar.

936

314

234

809

702

107

20

2156

117

986

936

50

12

(22)

c. c. ft. cub. ft. c. c. ft. cub. ft.

611

89) 479 7 11 (5 3 215

585

445

26

34

4

8

105

279

267

12

16

203

178

25

147) 7171° 17' 19" (48° 47' 34.5")

1291

1176

(24)

Fr.ells. gr. na. in. Fr.ells. grs. na. in.

115

267(1467 1 2 1 (8 2 8 2 1068

60

1385

6917

132

688

6

1037

793

1029

534

8

259

60

4

488

1038

441

801

58

237

21

475

591

5341

534

1

$$\frac{1}{2} \div 267 = 1 \div 1068 = \frac{1}{1068}$$

34

561

52

115

425

1988

(35)

miles. fur. per. yds. miles. fur. per. yds. ft. in.
 67) 916 6 0 4 (13 5 18 2 2 617

67

246

201

45

8

366

335

31

40

1240

67

570

536

34

54

191

134

57

3

171

134

37 ft.

37 ft.

12

444

402

42

Exercise 25.]

KEY.

67

(26)

161) £1911 17s. 0d. (£11 17s 5d. 119 far.

161

301

161

140

20

2817

161

1207

1127

80

12

960

805

155

4

623

483

140

lbs. oz. dwt. lbs. oz. dwt. grs.

963) 9134 4

8667

467

12

5608

4815

793

20

15877

963

6247

5778

469

24

11256

963

1626

963

663

68
10

KEY.

[ELEM. ARITH.]

(28)
bush. pk. gal. qt. pt. bush. pk. gal. qt. pt.
417) 7149 0 0 1 1 (17 0 0 1 10 1417

417

2979

2919

(29)

days. hrs. min. sec. days. hrs. min. sec.
60 603) 2716 14 17 9 (4 12 7 23 89

4

2412

240

304

2

24

480

7310

417

603

63

1280

4

1206

253

74

2

60

507

4457

417

4221

90

236

60

14169

1206

2109

1809

300

2100

ARITH.

pt.
1.10

n. sec.
23800

Exercise 24.]

EXERCISE

69

(30)

cwt. lbs. oz. cwt. qrs. lbs. oz. drs.
347)4000 19 11 (11 2 2 12 11 44
347

539

347

183

4

132

694

38

25

969

694

275

16

4411

347

941

694

247

16

3951

347

482

347

135

2

EXERCISE 26.

(1)

$$739 \text{ days } 4 \text{ hrs } 16 \text{ min.} = 63864960 \text{ sec.}$$

$$23 \text{ hrs. } 14 \text{ min. } 43 \text{ sec.} = 83682 \text{ sec.}$$

$$63864960 \div 83682 = 763\frac{1111}{1111}.$$

(2)

$$64967 \text{ os. } 0\frac{1}{2} \text{ d.} = 4768321 \text{ far.}$$

$$663 \text{ lrs.} = 61296 \text{ far.}$$

$$4768321 \div 61296 = 77\frac{8888}{1111}.$$

(3)

$$11192 \text{ lrs. } 8 \text{ d.} = 1145168 \text{ far.}$$

$$19 \text{ lrs. } 4\frac{1}{2} \text{ d.} = 9475 \text{ far.}$$

$$1145168 \div 9475 = 120\frac{8198}{1111}.$$

(4)

$$986 \text{ cwt. } 2 \text{ qrs. } 17 \text{ lbs.} = 1578672 \text{ oz.}$$

$$6 \text{ cwt. } 1 \text{ qr. } 17 \text{ lbs. } 9 \text{ oz.} = 10281 \text{ oz.}$$

$$1578672 \div 10281 = 153\frac{5872}{10281}.$$

(5)

$$426 \text{ a. } 1 \text{ r. } 23 \text{ per.} = 74294847 \text{ quarter-feet.}$$

$$2 \text{ a. } 8 \text{ per. } 17 \text{ yds. } 4 \text{ ft.} = 357820 \text{ quarter-feet.}$$

$$74294847 \div 357820 = 207\frac{339197}{1111}.$$

(6)

$$71 \text{ fur. } 16 \text{ per. } 3 \text{ yds. } 1 \text{ ft.} = 565608 \text{ inches.}$$

$$27 \text{ per. } 3 \text{ yds. } 2 \text{ ft. } 7 \text{ in.} = 5485 \text{ inches.}$$

$$565608 \div 5485 = 103\frac{543}{445}.$$

(7)

$$1122 \text{ cords } 3 \text{ c. ft.} = 143664 \text{ cub. ft.}$$

$$12 \text{ cords } 11 \text{ cub. ft.} = 1547 \text{ cub. ft.}$$

$$143664 \div 1547 = 92\frac{819}{1111}.$$

(8)

111 lbs. 4 oz. 7 dwt. = 641448 grains.

9 oz. 7 dwt. 17 grs. = 4505 grains.

$$641448 \div 4505 = 142\frac{1788}{4505}$$

(9)

1468 Eng. ells 2 qrs. 1 na. = 264321 quarter-inches.

73 Fl. ells 1 na. 1 in. = 7897 quarter-inches.

$$264321 \div 7897 = 33\frac{720}{7897}$$

(10)

476 bush. 1 gal. 1 pt. = 30473 pints.

3 bush. 1 pk. 1 qt. = 210 pints.

$$30473 \div 210 = 145\frac{23}{210}$$

(11)

6 lbs. 4 oz. 1 dr. = 36540 grs.

1 oz. 7 drs. 1 scr. 7 grs. = 927 grs.

$$36540 \div 927 = 39\frac{327}{927}$$

(12)

£9 4s. 7½d. = 8862 far.

3s. 11½d. = 189 far.

$$8862 \div 189 = 46\frac{188}{189}$$

(13)

7 acres = 43908480 sq. in.

17 sq. yds. 6 ft. 4 in. = 22900 sq. in.

$$43908480 \div 22900 = 1917\frac{1180}{22900}$$

(14)

927 m. 4 fur. 7 per. = 58767786 inches.

6 m. 3 inches = 380163 inches.

$$58767786 \div 380163 = 154\frac{33334}{380163}$$

(15)

11 years 47 days 1 hour = 97555 hours.

23 weeks 2 days 7 hours = 3919 hours.

$$97555 \div 3919 = 24\frac{925}{3919}$$

(16)

$$167 \text{ bush. } 1 \text{ pk.} = 5352 \text{ qts.}$$

$$9 \text{ bush. } 1 \text{ qt.} = 289 \text{ qts.}$$

$$5352 \div 289 = 18\frac{1}{2}.$$

(17)

$$17 \text{ tons} = 1360 \text{ qrs.}$$

$$14 \text{ cwt. } 3 \text{ qrs.} = 59 \text{ qrs.}$$

$$1360 \div 59 = 23\frac{2}{3}.$$

(18)

$$126 \text{ yards } 1 \text{ qr. } 2 \text{ na.} = 9099 \text{ half-inches.}$$

$$17 \text{ French ells } 1 \text{ qr. } 1 \text{ in.} = 1856 \text{ half-inches.}$$

$$9099 \div 1856 = 4\frac{1}{2}.$$

(19)

$$963 \text{ m. } 420 \text{ yds.} = 1695300 \text{ yds.}$$

$$7 \text{ fur. } 63 \text{ yds.} = 1603 \text{ yds.}$$

$$1695300 \div 1603 = 1057\frac{222}{1603}.$$

(20)

$$\text{£}1111 \text{ } 11\text{s. } 11\frac{1}{2}\text{d.} = 1067133 \text{ far.}$$

$$\text{£}12 \text{ } 13\text{s. } 4\frac{1}{2}\text{d.} = 12162 \text{ far.}$$

$$1067133 \div 12162 = 87\frac{9032}{12162}.$$

EXERCISE 27.

(1)

$$1789 \times 3 = 5367 \text{ qrs. by } 9 = 48303 \text{ in. } \div 12$$

$$= 4025\frac{1}{2} \text{ feet.}$$

(5)

$$75000 \times 123 = 922500 \text{ grs.} = 160 \text{ lbs. } 1 \text{ oz.}$$

$$17 \text{ dwt. } 12 \text{ gr.}$$

(7)

$$1120 \times 11 = 12320 \text{ ft.} = 2 \text{ miles } 2 \text{ fur. } 26 \text{ per. } 3 \text{ yds. } 2 \text{ ft.}$$

Exer

X 24902

15778

There

\$7940

39733

1

\$2-17

4 oz.

1 lb.

3 lbs

6 lbs

27 lbs

19 lbs

1 br

67 ac

(8)

$$\begin{aligned} & \times 24902\frac{1}{2} \text{ miles} \times 8 \times 40 \times 5\frac{1}{2} \times 3 \times 12 = 1577822400 \\ & \text{inches} = 1577822400 \text{ cents} = \$15778224. \\ & 1577822400 \div 100 = 15778224 \text{ lbs.} = 7889 \text{ tons } 2 \text{ cwt.} \\ & \quad 24 \text{ lbs.} \end{aligned}$$

(9)

There are *five* twenty-cent pieces in \$1.

$$\$794671 \times 5 = 3973355 \text{ pieces.}$$

$$3973355 \div 108 = 36790\frac{35}{108} \text{ minutes} = 3 \text{ weeks } 4 \text{ days } 13 \text{ hours } 10 \text{ min. } 19\frac{13}{108} \text{ sec.}$$

(10)

$$\$2.17 \times 365 = \$792.05.$$

(11)

$$4 \text{ oz. } 1 \text{ dwt. } 6 \text{ grs.} \times 3 \times 12 = 12 \text{ lbs. } 2 \text{ oz. } 5 \text{ dwt.}$$

(12)

1 lb. tea @ 75 cents.....	\$0.75
3 lbs. coffee @ 14 "	0.42
6 lbs. rice @ 5 "	0.30
27 lbs. sugar @ 11 "	2.97
19 lbs. raisins at 13 "	2.47
1 brl. flour at \$7.20.....	7.20

$$\text{Sum} = \$14.11$$

(14)

$$271496 \div 167 = 1625\frac{11}{167} \text{ times.}$$

(15)

$$9167 \times 714 = 6545238.$$

(16)

$$\begin{aligned} & 67 \text{ acres } 4 \text{ per. } 17 \text{ yds.} \div 9 = 7 \text{ a. } 1 \text{ r. } 31 \text{ per. } 18 \text{ yds.} \\ & \quad 6 \text{ ft. } 36 \text{ in.} \end{aligned}$$

(17)

From £16 11s.

Take 4 2

Rem. = £12 9 = sum to be equally divided
among the three.£12 9s. $\div 3$ = £4 3s. = share of 1st and 2nd.

3rd person gets £4 3s. + £4 2s. = £8 5s.

(18)

\$744 $\div 6$ = \$124 = share of first.

\$744 - \$124 = \$620 = remainder.

\$620 $\div 4$ = \$155 = share of second.

\$620 - \$155 = \$465 = remainder.

\$465 $\div 2$ = \$232.50 = share of each of the others.

(19)

176 \times 400 = 704.00A has \$704.89 $\frac{1}{2}$ 4s. \times 20 = .80

B has 694.89

5 $\frac{1}{2}$ = 23 far. $\times 5 \div 12$ = .09 $\frac{1}{2}$ Diff. = 10.99 $\frac{1}{2}$... £176 4s. 5 $\frac{1}{2}$ d. = \$704.89 $\frac{1}{2}$

(20)

ds. qrs. na. yds. qrs. na.

4 1 3 \times 7 = 31 0 1

10

44 1 2 \times 4 = 177 2 0

10

44 3 0 \times 1 = 443 3 0

10

4437 2 0 \times 1 = 4437 2 0

Sum = 5189 3 1

(21)

$$\begin{aligned} \$7196.40 &= 719640 \text{ cents} \div 100 = 7196\frac{1}{2} \text{ lbs.} \\ 71 \text{ cwt. } 96\frac{1}{2} \text{ lbs.} &= 3 \text{ tons } 11 \text{ cwt. } 3 \text{ qrs. } 21 \text{ lbs. } 6 \text{ oz. } 6\frac{1}{2} \text{ dra.} \end{aligned}$$

(22)

$$7 \text{ miles } 4 \text{ fur. } 17 \text{ per.} = 13293\frac{1}{2} \text{ yds} \div 2 = 6646\frac{1}{2} \text{ fath.}$$

(23)

$$\begin{aligned} \text{Dividend} &= \text{Quotient} \times \text{Divisor.} \\ &= 749 \times 47 = 35203. \end{aligned}$$

(24)

$$\begin{aligned} \overline{\text{XMMCI}} &= 12101 \\ 16701 - 12101 &= 4600. \end{aligned}$$

(25)

$$\begin{aligned} \text{Subtrahend} &= \text{Minuend} - \text{Remainder.} \\ &= 71467 - 61794 = 9673. \end{aligned}$$

(26)

$$\begin{aligned} \$679 - \$146 &= \$533 = \text{twice the share of the second.} \\ \$533 \div 2 &= \$266.50 = \text{share of second.} \\ \$266.50 + \$146 &= \$412.50 = \text{share of first.} \end{aligned}$$

(27)

$$\begin{aligned} 714 + 16 + 179 + 42 + 93 &= 1044 \\ 91467 - 234 - 946 - 1127 - 80040 + 27 - 67 + \\ 83 &= 91577 - 82474 = 9163 \\ 1044 \times 9163 &= 9566172 \end{aligned}$$

(28)

$$71467 \div 60 = 1191\frac{17}{60} = 1191\frac{1}{3} \text{ bush.}$$

(30)

$$1746 - 974 = 772$$

(31)

$$s. 11d. \times 23 = £7 19s. 1d.$$

(32)

$$62\frac{1}{2} \div 10 = 6\frac{1}{4} \text{ gallons} = 1 \text{ cubic foot.}$$

$$748 \times 6\frac{1}{4} = 4675 \text{ gallons.}$$

(33)

$$\begin{aligned} \times 1 \text{ mile} &= 1760 \text{ yds; } 1760 \div 5 = 352 \\ 352 \times 2 &= 704 = \text{number of feet } A \text{ gains while } B \text{ is} \\ &\text{running a mile.} \end{aligned}$$

$$704 \text{ ft.} = 234\frac{2}{3} \text{ yds.} = \text{whole number of yds. gained.}$$

But he started 17 yds. behind B .

$$\text{Therefore at end of race he will be } 234\frac{2}{3} - 17 = 217\frac{2}{3} \text{ yds. before } B.$$

(34)

$\times A$ is to have as much as B and C together, hence A is to have half.

$$\$749.80 \div 2 = \$374.80 = A's \text{ share.}$$

$$\text{Remainder} = \$374.80 \div 2 = \$187.40 = \text{share of } B \text{ or } C.$$

(35)

$\times 3 + 5 + 7 = 14$, hence as often as 14 is contained times in 2366 the first receives 2, the second 5, and the third 7.

$$2366 \div 14 = 169$$

$$169 \times 2 = 338 \text{ cub. ft.} = \text{share of first.}$$

$$169 \times 5 = 845 \text{ cub. ft.} = \text{share of second.}$$

$$169 \times 7 = 1183 \text{ cub. ft.} = \text{share of third.}$$

(36)

a.	r.	per.	a.	r.	
1	1	17	From	247	0
17	0	23	Take	59	3
21	1	0			
<hr/>					
32	3	0	Rem.	207	1

a. r. p. yds. in.

$$1 \div 3 = 69 \text{ } 0 \text{ } 13 \text{ } 10 \text{ } 108$$

Exercise 37, 28.]

KNT.

(37)

$$1120 \times 17 = 19040 \text{ ft.} = 6348 \text{ yds. } 2 \text{ ft.} = 1153 \text{ per. } 4\frac{1}{2} \text{ yds. } 2 \text{ ft.} = 1153 \text{ per } 5 \text{ yds. } 0 \text{ ft. } 6 \text{ in.} = 3 \text{ miles } 4 \text{ fur. } 33 \text{ per. } 5 \text{ yds. } 6 \text{ in.}$$

(38)

$$\begin{aligned} 12000 \times 313 &= 3756000 = \text{copies sold.} \\ 3756000 \times 5 &= 18780000d = \text{sum realized.} \\ 18780000d &= £78250 \\ £78250 \times 4 &= \$318000 \end{aligned}$$

(39)

$$710 - 297 = 413$$

(40)

$$\begin{aligned} \text{Weight} &= 219 \times 3000 = 657000 \text{ gra.} = 114 \text{ lbs. } 15 \text{ dw.} \\ 2s. 9\frac{1}{2}d. \times 3000 &= £418 15s = \$1675.00 \\ \$1675.00 \times 500 &= \$837500 \end{aligned}$$

(41)

$$\begin{aligned} £1 \times 400 &= 400 \\ 7s. \times 20 &= 140 \\ 4\frac{1}{2}d = 18 \text{ far.} \times 5 \div 12 &= 7\frac{1}{2} \\ \therefore £1 7s. 4\frac{1}{2}d. &= \$5.47\frac{1}{2} \\ \$5.47\frac{1}{2} \times 297 &= \$1626.02\frac{1}{2} \\ \$1626.02\frac{1}{2} \div \$3.17 &= 162602\frac{1}{2} \text{ cents} \div 317 \text{ cents} = 512\frac{1}{2} \text{ bbls. of flour.} \\ 325205 \text{ cents} \div 634 \text{ cents} &= 512\frac{1}{2} \end{aligned}$$

EXERCISE 28.

(1)

$$\begin{array}{r} 1024)2240(2 \\ \underline{2048} \end{array}$$

$$\begin{array}{r} 192)1024(5 \\ \underline{960} \end{array}$$

$$\begin{array}{r} 64)192(3 \\ \underline{192} \end{array}$$

$$G. C. M. = 64$$

(2)

$$\begin{array}{r} 1902)24409(12 \\ \underline{1902} \end{array}$$

$$\begin{array}{r} 5389 \\ \underline{3804} \end{array}$$

$$\begin{array}{r} 1585)1902(1 \\ \underline{1585} \end{array}$$

$$\begin{array}{r} 317)1585(5 \\ \underline{1585} \end{array}$$

$$G. C. M. = 317$$

(3)

1624)14500(8

12992

1508)1624(1

1508

116)1508(13

116

348

348

348

G. C. M. = 118

(4)

4609)8393(1

4609

3784)4609(1

3784

825)3784(4

3300

484)825(1

484

(6)

219)11476(52

1095

526

438

88)219(2

176

43)88(2

86

2)43(21

42

1)2(1

G. C. M. = 1

(5)

714)1176(1

714

462)714(1

462

252)462(1

252

210)252(1

210

341)484(1

321

143)341(2

286

55)143(2

110

33)55(1

33

22)33(1

22

11)22(2

22

G. C. M. = 11

$$\begin{array}{r}
 \text{(7)} \\
 194706)289913(1 \\
 \underline{194706} \\
 95207)194706(2 \\
 \underline{190414} \\
 4292)95207(22 \\
 \underline{8584} \\
 9367 \\
 \underline{8584} \\
 783)4292(5 \\
 \underline{3915} \\
 377)783(2 \\
 \underline{754} \\
 29)377(13 \\
 \underline{29} \\
 87 \\
 \underline{87} \\
 \text{G. C. M.} = 29
 \end{array}$$

$$\begin{array}{r}
 \text{(9)} \\
 1725)27525(15 \\
 \underline{1725} \\
 10275 \\
 \underline{8625} \\
 1650)1725(1 \\
 \underline{1650} \\
 75)1650(22 \\
 \underline{150} \\
 150 \\
 \underline{150} \\
 \text{G. C. M.} = 75
 \end{array}$$

$$\begin{array}{r}
 \text{(10)} \\
 2254)71001(31 \\
 \underline{6762} \\
 3381 \\
 \underline{2254} \\
 1127)2254(2 \\
 \underline{2254} \\
 \text{G. C. M.} = 1127
 \end{array}$$

18

80

KEY.

[ELEM. ANTE.]

871

(11)

11256) 19899(1

11256

8643) 11256(1

8643

2612) 8643(3

7839

204) 2612(3

2412

201) 804(4

804

G. C. M. = 201

(12)

5161) 7175(1

5161

2594) 5161(1

2594

2567) 2594(1

2567

27) 2567(95

243

137

135

2) 27(13

26

1) 2(2

I

G. C. M. = 1

663)

G. C.

Exercise 28.]

KEY.

81

$$\begin{array}{r} 87147)178871(2 \\ \underline{174294} \end{array}$$

(13)

$$\begin{array}{r} 4577)87147(19 \\ \underline{4577} \\ 41377 \\ \underline{41193} \end{array}$$

$$\begin{array}{r} 184)4577(24 \\ \underline{368} \\ 897 \\ \underline{736} \end{array}$$

$$\begin{array}{r} 161)184(1 \\ \underline{161} \end{array}$$

G. C. M. = 23

$$\begin{array}{r} 23)161(7 \\ \underline{161} \end{array}$$

$$\begin{array}{r} 663)1261(1 \\ \underline{663} \end{array}$$

(14)

$$\begin{array}{r} 918)1347(1 \\ \underline{918} \end{array}$$

(15)

$$\begin{array}{r} 598)663(1 \\ \underline{598} \end{array}$$

$$\begin{array}{r} 429)918(2 \\ \underline{858} \end{array}$$

$$\begin{array}{r} 65)598(9 \\ \underline{585} \end{array}$$

$$\begin{array}{r} 60)429(7 \\ \underline{420} \end{array}$$

$$\begin{array}{r} 13)65(5 \\ \underline{65} \end{array}$$

G. C. M. = 13

$$\begin{array}{r} 9)60(6 \\ \underline{54} \end{array}$$

$$\begin{array}{r} 6)9(1 \\ \underline{6} \end{array}$$

$$\begin{array}{r} 3)6(2 \\ \underline{6} \end{array}$$

G. C. M. = 3

$$\begin{array}{r} (16) \\ 187 \overline{) 255} (1 \\ 187 \end{array}$$

$$\begin{array}{r} 68 \overline{) 187} (2 \\ 136 \end{array}$$

$$\begin{array}{r} 51 \overline{) 68} (1 \\ 51 \end{array}$$

$$\begin{array}{r} 17 \overline{) 51} (3 \\ 51 \end{array}$$

$$G. O. M. = 17$$

$$\begin{array}{r} (17) \\ 1914 \overline{) 35786} (18 \\ 1914 \end{array}$$

$$\begin{array}{r} 16646 \\ 15312 \end{array}$$

$$\begin{array}{r} 1334 \overline{) 1914} (1 \\ 1334 \end{array}$$

$$\begin{array}{r} 580 \overline{) 1334} (2 \\ 1160 \end{array}$$

$$\begin{array}{r} 174 \overline{) 580} (3 \\ 522 \end{array}$$

$$\begin{array}{r} 58 \overline{) 174} (3 \\ 174 \end{array}$$

$$G. O. M. = 58$$

$$\begin{array}{r} (18) \\ 21671 \overline{) 22111} (1 \\ 21671 \end{array}$$

$$\begin{array}{r} 440 \overline{) 21671} (49 \\ 1760 \end{array}$$

$$\begin{array}{r} 4071 \\ 3960 \end{array}$$

$$\begin{array}{r} 111 \overline{) 440} (3 \\ 333 \end{array}$$

$$\begin{array}{r} 107 \overline{) 111} (1 \\ 107 \end{array}$$

$$\begin{array}{r} 4 \overline{) 107} (26 \\ 104 \end{array}$$

$$\begin{array}{r} 3 \overline{) 4} (1 \\ 3 \end{array}$$

$$\begin{array}{r} 1 \overline{) 3} (3 \\ 3 \end{array}$$

$$G. O. M. = 1$$

(19)	(20)
582)82159(141	212(452(2
582	424
2395	28)212(7
2328	196
679	16)28(1
582	16
97)582(6	12)16(1
582	12
G. C. M. = 97	4)12(3
	G. C. M. = 4
	12

EXERCISE 29.

(1)	(2)
6)8 .. 8 .. 80	30)80 .. 85
15)8 .. 8 .. 8	11
l. c. m. = $6 \times 15 = 90$	l. c. m. = $30 \times 11 = 330$
(3)	(4)
21)8 .. 21 .. 35 .. 4 .. 20	16)8 .. 16 .. 35 .. 56 .. 63
8 .. 20	35) .. 35 .. 7 63
l. c. m. = $21 \times 20 = 420$	l. c. m. = $16 \times 35 \times 9 = 5040$
(5)	
12)4 .. 4 .. 8 .. 8 .. 10 .. 12 .. 16 .. 18 .. 20	
	4 3 5
l. c. m. = $12 \times 4 \times 3 \times 5 = 720$	

(6)

99) 3 .. 9 .. 11 .. 22 .. 72 .. 32 .. 99

3 .. 9 .. 32 ..

$$l. c. m. = 99 \times 32 = 3168.$$

(7)

32) 6 .. 10 .. 14 .. 18 .. 22 .. 28 .. 32

8 .. 5 .. 9 .. 11 .. 7 ..

$$l. c. m. = 32 \times 5 \times 9 \times 11 \times 7 = 110880.$$

(8)

30) 4 .. 10 .. 15 .. 20 .. 25 .. 30 .. 35 .. 40

5 .. 7 .. 4

$$l. c. m. = 30 \times 5 \times 7 \times 4 = 4200.$$

(9)

6) 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9

5 .. 7 .. 4 .. 3

$$l. c. m. = 6 \times 7 \times 4 \times 3 \times 5 = 2520.$$

(10)

48) 3 .. 4 .. 9 .. 12 .. 48 .. 21 .. 24 .. 18

.. 3 7 ..

$$l. c. m. = 48 \times 3 \times 7 = 1008.$$

(11)

160) 3 .. 21 .. 63 .. 49 .. 160 .. 240 .. 300

63) .. 63 3 .. 15

$$l. c. m. = 160 \times 63 \times 5 = 50400.$$

5

(12)

$$16)16 \dots 41 \dots 38$$

$$\dots 41 \dots 19$$

$$l. c. m. = 16 \times 41 \times 19 = 12464.$$

(13)

$$l. c. m. = 9 \times 16 = 144.$$

(14)

$$72)112 \dots 200 \dots 72$$

$$14 \dots 25 \dots$$

$$l. c. m. = 72 \times 14 \times 25 = 25200.$$

(15)

$$90)90 \dots 36 \dots 63 \dots 12 \dots 7$$

$$\dots 2 \dots 7 \dots$$

$$l. c. m. = 90 \times 2 \times 7 = 1260.$$

(16)

$$3 \dots 5 \dots 7 \dots 9 \dots 11$$

$$l. c. m. = 5 \times 7 \times 9 \times 11 = 3465.$$

(17)

$$18)2 \dots 4 \dots 8 \dots 12 \dots 14 \dots 16 \dots 18 \dots 20 \dots 22 \dots 24 \dots 26 \dots 28 \dots 30 \dots 32$$

$$16) \dots \dots \dots \dots \dots \dots \dots \dots \dots 10 \dots 11 \dots 4 \dots 13 \dots 14 \dots 5 \dots 16$$

$$5 \dots 11 \dots \dots 13 \dots 7 \dots$$

$$l. c. m. = 18 \times 16 \times 5 \times 11 \times 13 \times 7 = 1441440$$

(18)

$$25)25 \dots 7 \dots 44 \dots 60 \dots 63 \dots 55 \dots 9 \dots 11 \dots 28 \dots 70 \dots 4$$

$$44) \dots \dots 44 \dots 12 \dots 63 \dots 11 \dots \dots \dots 28 \dots 14 \dots$$

$$4 \dots 63 \dots \dots \dots 7 \dots$$

$$l. c. m. = 25 \times 44 \times 63 = 69300.$$

(19)

$$720)720 \dots 396 \dots 252 \dots 540$$

$$\dots 11 \dots 7 \dots 3$$

$$l. c. m. = 720 \times 11 \times 7 \times 3 = 166320.$$

(20)

$$30)15 \dots 12 \dots 128 \dots 30 \dots 16 \dots 4 \dots 320 \dots 96$$

$$\dots 64 \dots 32 \dots 16$$

$$l. c. m. = 30 \times 64 = 1920.$$

EXERCISE 33.

(1)

$$\frac{1418}{11} = \frac{141}{11} = \frac{17}{1} = \frac{7}{1} \text{ (dividing in succession by 10, 2, and 11, or at once by 220).}$$

(2)

$$\frac{1111}{1091} = \frac{111}{109} = \frac{73}{1} \text{ (dividing in succession by 2 and 3 or at once by their G. C. M. 6).}$$

(3)

$\frac{1191}{1191}$, the terms have no common measure, therefore the fraction cannot be reduced.

(4)

$$\frac{1111}{111} = \frac{111}{111} = \frac{1}{1} \text{ (dividing in succession by 9 and 23 or at once by 207 the G. C. M. of the terms).}$$

(5)

$$\frac{1111}{111} = \frac{111}{111} = \frac{1}{1} \text{ (dividing by 2).}$$

(6)

$$\frac{111111}{11111} = \frac{1111}{1111} = \frac{1}{1} \text{ (dividing each term by 111).}$$

(7)

$$\frac{1111}{1111} = \frac{111}{111} = \frac{1}{1} \text{ (dividing each term by 7).}$$

(8)

$\frac{3333}{137} = \frac{1111}{41} = \frac{11}{4} \frac{1}{4}$ (dividing in succession by 3 and 137, or at once by 411, the G. U. M. of the terms).

(9)

$\frac{881}{211} = \frac{4}{1} \frac{1}{1}$ (dividing each term by 211).

(10)

$\frac{1527}{701}$; the terms have no common measure, and therefore the fraction cannot be reduced.

(11)

$\frac{58469}{11993} = \frac{59}{119} \frac{9}{3}$ (dividing both terms by 991, their G.C.M.)

(12)

$\frac{19481}{101} = \frac{194}{101} \frac{1}{1}$ (dividing both terms by 101, their G.C.M.)

EXERCISE 34.

(1)

1. c. m. of 2, 4, 5, and 10 = 20.

Then multiplier for 1st fraction $= \frac{20}{2} = 10$; for 2nd

$= \frac{20}{4} = 5$; for 3rd $= \frac{20}{5} = 4$; and for 4th $= \frac{20}{10} = 2$.

$\frac{1 \times 10}{2 \times 10} = \frac{10}{20}$; $\frac{3 \times 5}{4 \times 5} = \frac{15}{20}$; $\frac{4 \times 4}{5 \times 4} = \frac{16}{20}$; $\frac{7 \times 2}{10 \times 2} = \frac{14}{20}$.

(2)

l. c. m. of 5, 7, 9, 3, and 2 = 630.

$$\frac{630}{5} = 126; \frac{630}{7} = 90; \frac{630}{9} = 70; \frac{630}{3} = 210; \text{ and}$$

$$\frac{630}{2} = 315.$$

$$\frac{2 \times 126}{5 \times 126} = \frac{252}{630}; \frac{3 \times 90}{7 \times 90} = \frac{270}{630}; \frac{4 \times 70}{9 \times 70} = \frac{280}{630};$$

$$\frac{2 \times 210}{3 \times 210} = \frac{420}{630}; \frac{1 \times 315}{2 \times 315} = \frac{315}{630}$$

(3)

l. c. m. of 18, 7, 9, 6, 14 = 126.

$$\frac{126}{18} = 7; \frac{126}{7} = 18; \frac{126}{9} = 14; \frac{126}{6} = 21; \frac{126}{14} = 9.$$

$$\frac{7 \times 7}{18 \times 7} = \frac{49}{126}; \frac{6 \times 18}{7 \times 18} = \frac{108}{126}; \frac{5 \times 14}{9 \times 14} = \frac{70}{126};$$

$$\frac{5 \times 21}{6 \times 21} = \frac{105}{126}; \frac{3 \times 9}{14 \times 9} = \frac{27}{126}.$$

(4)

l. c. m. of 24, 12, 5, 3, 10, 18 = 360.

$$\frac{360}{24} = 15; \frac{360}{12} = 30; \frac{360}{5} = 72; \frac{360}{3} = 120;$$

$$\frac{360}{10} = 36; \frac{360}{18} = 20.$$

(Continued on next page.)

(4 continued.)

$$\begin{array}{lcl}
 7 \times 15 = \frac{105}{360}; & 11 \times 30 = \frac{330}{360}; & 3 \times 72 = \frac{216}{360}; \\
 24 \times 15 = \frac{360}{360}; & 12 \times 30 = \frac{360}{360}; & 5 \times 72 = \frac{360}{360}; \\
 2 \times 120 = \frac{240}{360}; & 7 \times 36 = \frac{252}{360}; & 13 \times 20 = \frac{260}{360}; \\
 3 \times 120 = \frac{360}{360}; & 10 \times 36 = \frac{360}{360}; & 18 \times 20 = \frac{360}{360}.
 \end{array}$$

(5)

1. c. m. of 2, 5, 36, 9, and 5 = 180.

$$\frac{180}{20} = 9; \quad \frac{180}{10} = 18; \quad \frac{180}{15} = 12; \quad \frac{180}{36} = 5; \quad \frac{180}{9} = 20;$$

$$\frac{180}{5} = 36.$$

$$\begin{array}{lcl}
 17 \times 9 = \frac{153}{180}; & 9 \times 18 = \frac{162}{180}; & 4 \times 12 = \frac{48}{180}; \\
 20 \times 9 = \frac{180}{180}; & 10 \times 18 = \frac{180}{180}; & 15 \times 12 = \frac{180}{180}; \\
 23 \times 5 = \frac{115}{180}; & 5 \times 20 = \frac{100}{180}; & 4 \times 36 = \frac{144}{180}; \\
 36 \times 5 = \frac{180}{180}; & 9 \times 20 = \frac{180}{180}; & 5 \times 36 = \frac{180}{180}.
 \end{array}$$

(6)

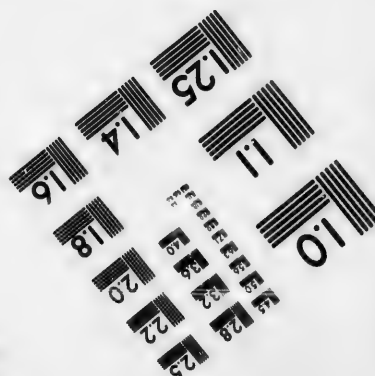
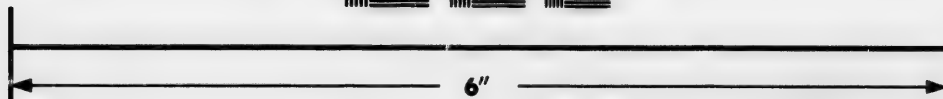
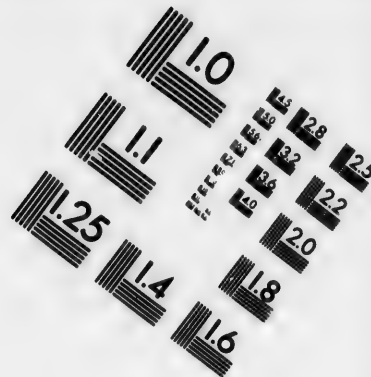
1. c. m. of 3, 4, 5, 6, 8 and 10 = 120.

$$\frac{120}{4} = 30; \quad \frac{120}{5} = 24; \quad \frac{120}{6} = 20;$$

$$\frac{120}{8} = 15; \quad \frac{120}{10} = 12.$$

$$\begin{array}{lcl}
 1 \times 40 = \frac{40}{120}; & 1 \times 30 = \frac{30}{120}; & 1 \times 24 = \frac{24}{120}; \\
 3 \times 40 = \frac{120}{120}; & 4 \times 30 = \frac{120}{120}; & 5 \times 24 = \frac{120}{120}; \\
 20 = \frac{20}{120}; & 1 \times 15 = \frac{15}{120}; & 1 \times 12 = \frac{12}{120}; \\
 & 8 \times 15 = \frac{120}{120}; & 10 \times 12 = \frac{120}{120}.
 \end{array}$$





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(7)

l. c. m. of 3, 4, 5 and 6 = 60.

$$\frac{60}{3} = 20; \frac{60}{4} = 15; \frac{60}{5} = 12; \frac{60}{6} = 10.$$

$$\frac{2 \times 20}{3 \times 20} = \frac{40}{60}; \frac{3 \times 15}{4 \times 15} = \frac{45}{60}; \frac{4 \times 12}{5 \times 12} = \frac{48}{60}; \frac{5 \times 10}{6 \times 10} = \frac{50}{60}.$$

(8)

l. c. m. of 8, 9, 10, 12, 15 and 18 = 360.

$$\frac{360}{8} = 45; \frac{360}{9} = 40; \frac{360}{10} = 36; \frac{360}{12} = 30;$$

$$\frac{360}{15} = 24; \frac{360}{18} = 20.$$

$$\frac{7 \times 45}{8 \times 45} = \frac{315}{360}; \frac{8 \times 40}{9 \times 40} = \frac{320}{360}; \frac{9 \times 36}{10 \times 36} = \frac{324}{360};$$

$$\frac{11 \times 30}{12 \times 30} = \frac{330}{360}; \frac{13 \times 24}{15 \times 24} = \frac{312}{360}; \frac{17 \times 20}{18 \times 20} = \frac{340}{360}.$$

(9)

l. c. m. of 13, 17, 19 = 4199.

$$\frac{4199}{13} = 323; \frac{4199}{17} = 247; \frac{4199}{19} = 221.$$

$$\frac{11 \times 323}{13 \times 323} = \frac{3553}{4199}; \frac{14 \times 247}{17 \times 247} = \frac{3458}{4199}; \frac{16 \times 221}{19 \times 221} = \frac{3536}{4199}$$

(10)

l. c. m. of 17, 10, 16 and 12 = 4080.

$$\frac{4080}{17} = 240; \frac{4080}{10} = 408; \frac{4080}{16} = 255; \frac{4080}{12} = 340.$$

$$\begin{array}{r} 12 \times 240 \quad 2880 \quad 9 \times 408 \quad 3672 \quad 15 \times 255 \quad 3825 \\ \hline 17 \times 240 \quad 4080 \quad 10 \times 408 \quad 4080 \quad 16 \times 255 \quad 4080 \\ \hline 7 \times 340 \quad 2380 \\ \hline 12 \times 340 \quad 4080 \end{array}$$

(11)

l. c. m. of 10, 12, 15 and 21 = 420.

$$\begin{array}{r} 420 \quad 420 \quad 420 \quad 420 \\ \hline 10 = 42, \quad 12 = 35; \quad 15 = 28; \quad 21 = 20. \\ \hline 9 \times 42 \quad 378 \quad 11 \times 35 \quad 385 \quad 13 \times 28 \quad 364 \\ \hline 10 \times 42 \quad 420 \quad 12 \times 35 \quad 420 \quad 15 \times 28 \quad 420 \\ \hline 16 \times 20 \quad 320 \\ \hline 21 \times 20 \quad 420 \end{array}$$

(12)

l. c. m. of 5, 7, 11, 9, 3, 14 and 22 = 6930.

$$\frac{6930}{5} = 1386; \frac{6930}{7} = 990; \frac{6930}{11} = 630; \frac{6930}{9} = 770;$$

$$\frac{6930}{3} = 2310; \frac{6930}{14} = 495; \frac{6930}{22} = 315.$$

$$\begin{array}{r} 2 \times 1386 \quad 2772 \quad 4 \times 990 \quad 3960 \quad 6 \times 630 \quad 3780 \\ \hline 5 \times 1386 \quad 6930 \quad 7 \times 990 \quad 6930 \quad 11 \times 630 \quad 6930 \end{array}$$

(Continued on next page.)

(12 continued.)

$$\begin{array}{rcl}
 4 \times 770 & 3080 & 2 \times 2310 \\
 \hline
 9 \times 770 & 6930 & 3 \times 2310
 \end{array}
 \quad
 \begin{array}{rcl}
 4620 & 11 \times 495 & \\
 \hline
 6930 & 14 \times 495 & \\
 \hline
 5445 & 17 \times 315 & 5355 \\
 \hline
 6930 & 22 \times 315 & 6930
 \end{array}$$

EXERCISE 35.

(1)

STATEMENT.

$$\begin{array}{rcl}
 1 \times 4 \times 27 \times 10 \times 7 & & \\
 \hline
 3 \times 9 \times 40 \times 13 \times 5 & &
 \end{array}
 =$$

CANCELLED.

$$\begin{array}{rcl}
 1 \times 4 \times 27 \times 10 \times 7 & 7 & 7 \\
 \hline
 3 \times 9 \times 40 \times 13 \times 5 & 13 \times 5 & 65
 \end{array}$$

(2)

STATEMENT.

$$\begin{array}{rcl}
 1 \times 1 \times 4 \times 15 \times 34 & & \\
 \hline
 2 \times 3 \times 5 \times 17 \times 19 & &
 \end{array}
 =$$

CANCELLED.

$$\begin{array}{rcl}
 1 \times 1 \times 4 \times 15 \times 34 & 4 & \\
 \hline
 2 \times 3 \times 5 \times 17 \times 19 & 19 &
 \end{array}$$

(3)

STATEMENT.

$$\frac{2 \times 1 \times 14 \times 9 \times 32}{7 \times 4 \times 61 \times 18 \times 1} =$$

CANCELLED.

$$\frac{\overset{2}{\cancel{2}} \times \overset{2}{\cancel{1}} \times \overset{2}{\cancel{14}} \times \overset{2}{\cancel{9}} \times \overset{2}{\cancel{32}}}{\overset{2}{\cancel{7}} \times \overset{2}{\cancel{4}} \times 61 \times \overset{2}{\cancel{18}} \times 1} = \frac{2 \times 9}{61} = \frac{18}{61}$$

(4)

STATEMENT.

$$\frac{17 \times 1 \times 3 \times 9 \times 22}{7 \times 9 \times 34 \times 11 \times 1} =$$

CANCELLED.

$$\frac{\overset{2}{\cancel{17}} \times \overset{2}{\cancel{1}} \times \overset{2}{\cancel{3}} \times \overset{2}{\cancel{9}} \times \overset{2}{\cancel{22}}}{\overset{2}{\cancel{7}} \times \overset{2}{\cancel{9}} \times \overset{2}{\cancel{34}} \times \overset{2}{\cancel{11}} \times 1} = \frac{3}{7}$$

(5)

STATEMENT.

$$\frac{2 \times 4 \times 55 \times 1}{5 \times 11 \times 2 \times 4} =$$

CANCELLED.

$$\frac{\overset{5}{\cancel{2}} \times \overset{5}{\cancel{4}} \times \overset{5}{\cancel{55}} \times 1}{\overset{5}{\cancel{5}} \times \overset{5}{\cancel{11}} \times \overset{5}{\cancel{2}} \times \overset{5}{\cancel{4}}} = 1$$

(6)

STATEMENT.

$$\frac{2 \times 31 \times 97 \times 1}{11 \times 9 \times 2 \times 31} =$$

CANCELLED.

$$\frac{2 \times 31 \times 97 \times 1}{11 \times 9 \times 2 \times 31} = \frac{97}{11 \times 9} = \frac{97}{99}$$

(7)

STATEMENT.

CANCELLED.

$$\frac{3 \times 13}{27 \times 64 \times 1 \times 7 \times 13} = \frac{13 \times 3}{4 \times 7 \times 8 \times 2 \times 4} = \frac{39}{2} = 19\frac{1}{2}$$

(8)

STATEMENT.

CANCELLED.

$$\frac{17}{109 \times 1 \times 11 \times 158} = \frac{109}{4 \times 2 \times 17 \times 20} = \frac{109}{80} = 1\frac{29}{80}$$

(9)

STATEMENT.

$$\frac{2 \times 35 \times 45 \times 1}{11 \times 4 \times 7 \times 25} =$$

CANCELLED.

$$\frac{7 \times 9}{2 \times 35 \times 45 \times 1} = \frac{9}{11 \times 2} = \frac{9}{22}$$

(10)

STATEMENT.

$$\frac{1 \times 2 \times 3 \times 4 \times 5 \times 8}{2 \times 3 \times 4 \times 5 \times 6 \times 11} =$$

CANCELLED.

$$\frac{1 \times \overset{4}{\cancel{2}} \times \cancel{3} \times \cancel{4} \times \cancel{5} \times \overset{4}{\cancel{8}}}{\underset{3}{\cancel{2}} \times \cancel{3} \times \cancel{4} \times \cancel{5} \times \cancel{6} \times 11} = \frac{4}{3 \times 11} = \frac{4}{33}$$

(11)

STATEMENT.

$$\frac{9 \times 7 \times 13 \times 21 \times 31}{4 \times 2 \times 3 \times 4 \times 5} =$$

CANCELLED.

$$\frac{\overset{3}{\cancel{9}} \times 7 \times 13 \times 21 \times 31}{4 \times 2 \times \cancel{3} \times 4 \times 5} = \frac{177723}{160} = 1110\frac{123}{160}$$

(12)

STATEMENT.

CANCELLED.

$$\frac{\overset{5}{\cancel{23}} \times \overset{13}{\cancel{35}} \times \overset{4}{\cancel{55}} \times 11 \times \overset{4}{\cancel{16}} \times 1}{7 \times \cancel{4} \times \cancel{7} \times 13 \times \overset{5}{\cancel{23}} \times \overset{5}{\cancel{25}}} = \frac{11 \times 4}{7} = \frac{44}{7} = 6\frac{2}{7}$$

EXERCISE 36.

(1)

$$\frac{\overset{2}{\cancel{2}}}{\overset{2}{\cancel{2}}} = \frac{\overset{2}{\cancel{2}}}{\overset{2}{\cancel{2}}} = \frac{2 \times 5}{1 \times 3} = \frac{10}{3} = 3\frac{1}{3}$$

(3)

$$\frac{7}{11} = \frac{7}{11} = \frac{7 \times 1}{9 \times 11} = \frac{7}{99}$$

(3)

$$\frac{7}{11} = \frac{4 \times 11}{7 \times 9} = \frac{44}{63}$$

(4)

$$\frac{2\frac{1}{2}}{7} = \frac{11}{7} = \frac{11 \times 1}{4 \times 7} = \frac{11}{28}$$

(5)

$$\frac{9}{3\frac{1}{2}} = \frac{9}{3\frac{1}{2}} = \frac{9 \times 11}{3\frac{1}{2} \times 1} = \frac{11}{4} = 2\frac{3}{4}$$

(6)

$$\frac{2\frac{1}{2}}{19\frac{1}{2}} = \frac{11}{12\frac{1}{2}} = \frac{11 \times 7}{5 \times 136} = \frac{77}{680}$$

(7)

$$\frac{6\frac{1}{2}}{7\frac{1}{2}} = \frac{3\frac{1}{2}}{4\frac{1}{2}} = \frac{3\frac{1}{2} \times 9}{5 \times 65} = \frac{306}{325}$$

(8)

$$\frac{4\frac{1}{2}}{9\frac{1}{2}} = \frac{2\frac{1}{2}}{1\frac{1}{2}} = \frac{31 \times 2}{7 \times 19} = \frac{62}{133}$$

(9)

$$\frac{6\frac{1}{2}}{9} = \frac{1\frac{1}{2}}{7\frac{1}{2}} = \frac{13 \times 1}{2 \times 9} = \frac{13 \times 1 \times 2}{2 \times 9 \times 15} = \frac{13}{9 \times 15} = \frac{13}{135}$$

(10)

$$\begin{aligned} \frac{4\frac{1}{2}}{7\frac{1}{2}} &= \frac{4\frac{1}{2}}{1\frac{1}{2}} = \frac{8\frac{1}{2}}{3} = \frac{17}{6} \\ &= \frac{17 \times 13}{6 \times 13} = \frac{221}{78} \\ &= \frac{221 \div 13}{78 \div 13} = \frac{17}{6} \\ &= 2\frac{5}{6} = 2\frac{8\frac{1}{2}}{13} \end{aligned}$$

(11)

$$\frac{2\frac{1}{2}}{4\frac{1}{2}} = \frac{5}{9} = \frac{5 \times 3}{9 \times 3} = \frac{15}{27}$$

(12)

$$\begin{aligned} \frac{6\frac{1}{2}}{3\frac{1}{2}} &= \frac{13}{7} \\ &= \frac{13 \times 2}{7 \times 2} = \frac{26}{14} \\ &= \frac{26 \div 2}{14 \div 2} = \frac{13}{7} \\ &= 1\frac{6}{7} \\ &= 1\frac{6 \times 2}{7 \times 2} = 1\frac{12}{14} \\ &= 1\frac{6}{7} \end{aligned}$$

EXERCISE 27.

(1)

$$\frac{1}{11} \text{ day} = \frac{1}{11 \times 7} = \frac{1}{77} \text{ week.}$$

(2)

$$\frac{4}{29} \text{ cwt.} = \frac{4 \times 4}{29} = \frac{16}{29} \text{ qr.}$$

(3)
 $\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{1}{4}$ of a yard = $\frac{1}{8}$ yard.

Then $\frac{1}{8}$ yard = $\frac{1 \times 4}{5} = \frac{1}{5}$ qr.

And $\frac{1}{5}$ of a qr. = $\frac{4}{5 \times 3} = \frac{4}{15}$ of a Fl. ell.

(4)
 $\frac{3}{4}$ of $\frac{1}{17}$ of $\frac{1}{5}$ of a mile = $\frac{1}{119}$ of a mile.

Then $\frac{1}{119}$ mile = $\frac{15 \times 8 \times 40}{38} = 349^a$ per.

(5)
 $\frac{3}{4}$ of $\frac{1}{2}$ of $3\frac{1}{2}$ inches = $1\frac{3}{8}$ inches.

Then $1\frac{3}{8}$ in. = $\frac{49}{20 \times 12 \times 3} = 1\frac{49}{120}$ yds.

(6)
 $\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{1}{2}$ of 6 oz. = $1\frac{3}{8}$ oz.

$\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{1}{2}$ of a scr. = $\frac{3}{117}$ of a scr.

Then $1\frac{3}{8}$ oz. $\div \frac{3}{117} = \frac{117 \times 8 \times 3 \times 28}{133 + 3} = 3744$.

(7)
 $\frac{1}{16}$ of $\frac{1}{11}$ of $\frac{1}{2}$ of $\frac{2\frac{1}{2}}$ of a pt. = $\frac{1}{176}$ of a pt.

$\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{4\frac{1}{2}}$ of a bush. = $\frac{19}{100}$ of a bush.

$\frac{19}{100}$ pt. = $\frac{66 \times 2 \times 4 \times 2 \times 4 \times \frac{19}{100}}{49 \times 49 \times 25}$ of a bush. =
 $\frac{30064}{20064} = 1\frac{19}{20064}$.

(8)

 $\frac{3}{4}$ of $\frac{1}{11}$ of 63s. = $\frac{9}{11}$ of a s.

$$\text{Then } \frac{9}{11} \text{ of a s.} = \frac{54}{77 \times 20} = \frac{27}{770} \text{ of a } \pounds.$$

(9)

 $\frac{1}{11}$ of 42 hrs. = $\frac{24}{11}$ hrs.

$$\text{Then } \frac{24}{11} \text{ hrs.} = \frac{95}{44 \times 24 \times 7} = \frac{25}{7392} \text{ of a week.}$$

(10)

$\frac{2}{3}$ of a lb. = $\frac{1}{3}$ of a lb., and $\frac{1}{4}$ of $\frac{3}{4}$ of $\frac{41}{67}$ of $\frac{91}{11}$ of a dwt.
 = $\frac{323}{670}$ of a dwt.

$$\text{Then } \frac{1}{3} \text{ of a lb.} \div \frac{323}{670} \text{ dwt.} = \frac{1 \times 12 \times 20 \times 280}{2 \times 323} = \frac{33600}{323}$$

(11)

$\frac{3}{4}$ of $4\frac{1}{2}$ of $\frac{91}{16\frac{1}{2}}$ of $\frac{37}{37}$ of an acre = $\frac{21}{16}$ acres.

$$\text{Then } \frac{21}{16} \text{ a.} \div \frac{3}{4} \text{ sq. yds.} = \frac{57 \times 4 \times 40 \times 30\frac{1}{2} \times 7}{28 \times 3} = \frac{22220}{2}$$

(12)

$\frac{41}{7}$ of $\frac{6}{31}$ of $\frac{1}{1}$ of $\frac{1}{7}$ of a far. = $\frac{36}{35}$ of a far.

$$\text{Then } \frac{36}{35} \text{ of a far.} = \frac{36}{35 \times 4 \times 12 \times 20} = \frac{3}{7350} \text{ of a } \pounds.$$

EXERCISE 38.

(1)

$$2 \text{ hrs. } 17 \text{ min.} = 137 \text{ min.}$$

$$1 \text{ wk. } 17 \text{ hrs.} = 11100 \text{ "}$$

Therefore the answer is 11137 .

(2)

$$19 \text{ lbs. } 7 \text{ oz. } 21 \text{ grs.} = 112821 \text{ grs.}$$

$$11 \text{ lbs. } 7 \text{ oz. } 9 \text{ dwt.} = 68936 \text{ "}$$

Therefore the answer is 112831 ~~68936~~ = 112917 ~~$= 112944$~~ .

(3)

$$6 \text{ per. } 16 \text{ yds. } 2 \text{ ft. } 11 \text{ in.} = 256259 \text{ in.}$$

$$7 \text{ r. } 14 \text{ per.} = 11525976 \text{ in.}$$

Therefore the answer is 11526032 ~~11525976~~ .

(4)

$$3 \text{ qrs. } 1 \text{ na. } 1 \text{ in.} = 30\frac{1}{2} \text{ in.}$$

$$3 \text{ Eng. e. } 1 \text{ qr. } 2 \text{ na.} = 146\frac{1}{2} \text{ in.}$$

$$\text{Therefore the answer is } \frac{30\frac{1}{2} \quad 11}{146\frac{1}{2} \quad 54} = \frac{\quad}{\quad}$$

(5)

$$27 \text{ wks. } 2 \text{ dys. } 4 \text{ hrs. } 7 \text{ min.} = 275287 \text{ min.}$$

$$1 \text{ year} = 525960 \text{ "}$$

Therefore the answer is 275337 ~~275287~~ .

(6)

$$2 \text{ qts. } 1 \text{ pt.} = 5 \text{ pts.}$$

$$7 \text{ bus. } 1 \text{ pk.} = 464 \text{ pts.}$$

Therefore the answer is 469 ~~464~~ .

(7)

$$1 \text{ lb. } 1 \text{ oz.} = 17 \text{ oz.}$$

$$3 \text{ cwt. } 3 \text{ qrs. } 17 \text{ lbs.} = 6272 \text{ oz.}$$

Therefore the answer is 6289 ~~6272~~ .

(8)

£176 18s. 7½d. = 84927 half-pence.

£217 19s. 11d. = 104638 "

Therefore the answer is $\frac{84927}{104638}$.

(9)

6s. 11½d. = 335 farthings.

Therefore 17 far. is $\frac{17}{335}$ of 6s. 11½d.

(10)

1 a. = 4840 yds.

Therefore 27 yds. = $\frac{27}{4840}$ of 1 acre.

(11)

7 drs. 1 scr. 17 grs. = 457 grs. and 7 lbs. 4 oz. 7 drs.
= 42660 grs.

Therefore 7 drs. 1 scr. 17 grs. is $\frac{457}{42660}$ of 7 lbs. 4 oz.
7 drs.

(12)

$\frac{1}{4}$ of $\frac{3}{4}$ of $\frac{1}{2}$ of £7 8s. 3½d. = $\frac{1}{4}$ of 7117 farthings =
 $\frac{1717}{4}$ far.

$\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{1717}{6}$ of £6 7s. 8½d. = $\frac{1}{2}$ of 6130 far. = 3065 far.

Therefore the answer is $\frac{7117}{3065} = \frac{7117}{18260}$.

(12)

 $\frac{3}{4}$ of $\frac{2}{3}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of 1 qr. 17 lbs. = $\frac{1}{10}$ of 42 lbs. = $2\frac{1}{2}$ lbs.

 $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{1}{3}$ of 6 cwt. 1 qr. = $\frac{2}{15}$ of 625 lbs. = $1\frac{1}{3}$ lbs.

Therefore the answer is $\frac{2\frac{1}{2}}{1\frac{1}{3}} = \frac{273}{6250}$

(14)

 $\frac{2}{11}$ of $\frac{1}{2}$ of $\frac{16\frac{1}{2}}{20}$ of 6 roods 17 per. = $\frac{1}{10}$ of 7774 $\frac{1}{2}$ yds.
 = $3109\frac{2}{10}$ yds.

 $\frac{1}{11}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{2}{3}$ of 9 acres 11 yds. = $\frac{1}{4}$ of 43571 yds.
 = $21\frac{1}{4}$ yds.

Therefore the answer is $\frac{3109\frac{2}{10}}{21\frac{1}{4}} = \frac{2827}{722} = \frac{12782}{316800}$.

(15)

 $\frac{1}{2}$ of $7\frac{1}{2}$ of $8\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{1}{2}$ of 17 cord feet = $\frac{3}{8}$ of 272 cub. ft. = $57\frac{1}{2}$ cub. ft.

 $\frac{1}{11}$ of $5\frac{1}{2}$ of $\frac{1}{2}$ of 3 cords 56 cub. ft. = $\frac{1}{2}$ of 440 cub. ft. = 660 cub. ft.

Therefore the answer is $\frac{57\frac{1}{2}}{660} = \frac{17}{176} = \frac{17}{176}$.

EXERCISE 29.

(1)

wk. dys.
7) 1 0

1 day.

(2)

$\frac{1}{2}$ of $\frac{1}{2}$ of a bush. = $\frac{1}{4}$ bush.

3 bush. \div 8 = 1 pk. 1 gal.

(3)

$\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{9\frac{1}{2}}{3\frac{1}{2}}$ of a hhd. = $1\frac{1}{4}$ hhd.

hhd.

455)304	bar.	gal.	qts.	pts.
2(	1	10	2	332

608

455

153

31 $\frac{1}{2}$

4819 $\frac{1}{2}$

4550

269 $\frac{1}{2}$

4

1078

910

168

2

336

(4)

$$\frac{1}{11} \text{ of } 8\frac{1}{2} \text{ lbs.} = \frac{1}{2} \text{ lb. and } 3 \text{ lbs. } \div 4 = 9 \text{ oz.}$$

(5)

$$\frac{3}{7} \text{ of } \frac{3}{11} \text{ of } \frac{8\frac{1}{2}}{17} \text{ of an acre} = \frac{3}{77} \text{ acres.}$$

a.

$$\begin{array}{r} 77 \overline{) 3 \text{ per. yds. ft. in.}} \\ 4 \overline{) 6 \quad 7 \quad 0 \quad 92\frac{1}{2}} \end{array}$$

12

40

480

462

18

30 $\frac{1}{2}$ 544 $\frac{1}{2}$

539

5 $\frac{1}{2}$

9

49 $\frac{1}{2}$

144

7128

693

198

154

$$\frac{47}{77} = \frac{4}{7}.$$

(6)

$\frac{1}{4}$ of $1\frac{3}{4}$ of $6\frac{1}{2}$ of $1\frac{1}{4}$ of a French ell = $\frac{2}{5}$ of a Fr. ell.

Fr. e. na. in.

85)9(2 1 $\frac{37}{5}$

8

54

4

216

170

46

2 $\frac{1}{2}$

103 $\frac{1}{2}$

85

18 $\frac{1}{2}$

37

85

170

(7)

$\frac{2}{3}$ of $\frac{3}{4}$ of a £ = $1\frac{3}{5}$ of a £

£3 ÷ 10 = 6s.

(8)

$7\frac{1}{2}$ of $3\frac{1}{2}$ of $\frac{9\frac{1}{2}}{7\frac{1}{2}}$ of an acre = $2\frac{3}{8}$ acres.

a.

r.

per.

8)285

0

0

35

2

20

(9)

 $7\frac{1}{2}$ of $9\frac{1}{2}$ of $\frac{1}{3}$ of a mile = $5\frac{3}{4}$ mile.

miles. fur.

4)53 0

13 2

(10)

 $\frac{2}{3}$ of $\frac{1}{2}$ of $\frac{1}{3}$ of 35 cwt. = $\frac{3}{4}$ cwt.

cwt. qrs. lbs. oz. drs.

3)8 0 0 0 0

2 2 16 10 10 $\frac{2}{3}$

(11)

 $\frac{1}{11}$ of $\frac{1}{2}$ of a lb. = $\frac{1}{22}$ of a lb.

lbs. oz. drs. scr. grs.

77)16 0 0 0 0

2 3 2 16 $\frac{2}{3}$

(12)

 $3\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{1}{11}$ of $\frac{1}{2}$ of a £ = $\frac{1}{77}$ of a £ $7\frac{1}{2}$

£ s. d.

77)4 0 0

1 0 $\frac{2}{3}$

EXERCISE 40.

(1)

 $\frac{1}{2} + \frac{1}{3} + \frac{1}{11} + \frac{1}{6} + \frac{1}{7}$

These fractions reduced to a common denominator become

$$\frac{623}{1386} + \frac{524}{1386} + \frac{504}{1386} + \frac{1154}{1386} + \frac{1078}{1386} = \frac{4984}{1386} = \frac{2012}{693} = 2\frac{88}{693}.$$

(2)

$$\frac{3}{8} + \frac{2}{8} + \frac{1}{8} + \frac{3}{8} + \frac{1}{8} + \frac{3}{8}.$$

These fractions reduced to a common denominator become

$$\frac{3312}{3468} + \frac{1386}{3468} + \frac{820}{3468} + \frac{770}{3468} + \frac{620}{3468} + \frac{162}{3468} \\ = \frac{6548}{3468} = 1\frac{3080}{3468}.$$

(3)

$$\frac{1}{6} + \frac{2}{6} + \frac{5}{6} + \frac{3}{6} + \frac{7}{6}.$$

These fractions reduced to a common denominator become

$$\frac{16}{60} + \frac{20}{60} + \frac{50}{60} + \frac{30}{60} + \frac{70}{60} = \frac{186}{60} = \frac{31}{10} = 3\frac{1}{10}.$$

(4)

$$\frac{2}{3} + \frac{1}{2} + \frac{2}{3} + \frac{9}{12} = 1 + 2 + 9 + \frac{2}{3} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \\ 12 + \frac{56}{140} + \frac{146}{140} + \frac{240}{140} + \frac{70}{140} = 12 + \frac{346}{140} \\ = 12 + 1\frac{173}{70} = 13\frac{173}{70}.$$

(5)

$$6\frac{1}{2} + 11\frac{1}{2} + 196\frac{1}{2} + 29\frac{1}{2} = 6 + 11 + 196 + 29 + \frac{1}{2} + \\ 105 + 280 + 84 + 360 \\ \frac{2}{3} + \frac{1}{6} + \frac{9}{6} = 242 + \frac{105 + 280 + 84 + 360}{420} =$$

$$242 + \frac{829}{420} = 242 + 1\frac{409}{210} = 243\frac{409}{210}.$$

(6)

$$8\frac{1}{2} + 11\frac{1}{2} + \frac{9}{2} + \frac{3}{2} + 16\frac{3}{4} \\ = 8 + 11 + 16 + \frac{1}{2} + \frac{11}{2} + \frac{9}{2} + \frac{3}{2} + \frac{3}{4} \\ 315 + 1155 + 1080 + 1008 + 700 \\ = 35 + \frac{315 + 1155 + 1080 + 1008 + 700}{1260} \\ = 35 + \frac{3548}{1260} = 35 + \frac{887}{315} = 35 + 2\frac{281}{315} = 37\frac{281}{315}.$$

(7)

$$196\frac{3}{4} + 16\frac{1}{2} + 20\frac{1}{4} = 196 + 16 + 20 + \frac{3}{4} + \frac{1}{2} + \frac{1}{4} \\ 627 + 1309 + 532 \\ = 232 + \frac{627 + 1309 + 532}{1463} = 232 + 1\frac{229}{1463} \\ = 233 + \frac{229}{1463}.$$

(8)

$$\begin{aligned}
 200\frac{1}{2} + 763\frac{1}{2} + 916\frac{3}{4} &= 200 + 763 + 916 + \frac{1}{2} + \frac{1}{2} + \frac{3}{4} \\
 &\quad 35 + 14 + 30 \\
 &= 1879 + \frac{\quad}{70} = 1879 + \frac{78}{70} = 1879 + 1\frac{29}{35} \\
 &= 1880\frac{29}{35}.
 \end{aligned}$$

(9)

$$\begin{aligned}
 17\frac{1}{2} + 19\frac{1}{2} + 20\frac{1}{2} + 21\frac{1}{2} &= 17 + 19 + 20 + 21 + \\
 &\quad \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 77 + \frac{133888}{133888} + \frac{133888}{133888} + \\
 &\quad \frac{133888}{133888} + \frac{133888}{133888} = 77 + \frac{41277}{133888} = 77 + \\
 &\quad 31\frac{27227}{133888} = 80\frac{197227}{133888}.
 \end{aligned}$$

(10)

$$\begin{aligned}
 6\frac{1}{2} + 8\frac{1}{2} + 11\frac{1}{2} + 9\frac{1}{2} + 16\frac{3}{4} &= 6 + 8 + 11 + 9 + 16 \\
 &\quad + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{3}{4} \\
 &\quad 140 + 105 + 315 + 84 + 120 \\
 &= 50 + \frac{420}{420} \\
 &= 50 + \frac{784}{420} = 50 + 1\frac{86}{105} = 51\frac{86}{105}.
 \end{aligned}$$

(11)

$$\begin{aligned}
 \frac{1}{2} \text{ of } \frac{2}{3} + \frac{1}{3} \text{ of } \frac{4}{5} + \frac{2}{5} \text{ of } 6\frac{2}{3} &= 1\frac{2}{3} + \frac{4}{15} + 5\frac{1}{3} \\
 &\quad 945 + 392 + 1710 \\
 &= 5 + \frac{\quad}{4410} = 5\frac{2447}{4410}.
 \end{aligned}$$

(12)

$$\begin{aligned}
 \frac{2}{3} \text{ of } \frac{1}{2} \text{ of } \frac{3}{4} + 9\frac{1}{2} + 6\frac{3}{4} + \frac{2}{3} \text{ of } \frac{1}{2} \text{ of } \frac{3}{4} &= 9 + 6 + 7\frac{1}{2} + \\
 &\quad \frac{77}{77} + \frac{220}{220} + \frac{120}{120} + \frac{44}{44} \\
 &\quad \frac{1}{2} + \frac{3}{4} + \frac{1}{2} = 15 + \frac{\quad}{440} \\
 &= 16\frac{21}{44}.
 \end{aligned}$$

(13)

$$\begin{aligned}
 7\frac{1}{2} + 9\frac{1}{2} + 16\frac{3}{4} + 20\frac{1}{2} + \frac{1}{2} \text{ of } \frac{2}{3} \text{ of } \frac{4}{5} \text{ of } 1\frac{2}{3} &= 7 + 9 + \\
 &\quad 16 + 20 + \frac{2}{3} + \frac{1}{2} + \frac{2}{3} + \frac{1}{2} + \frac{1}{2} \\
 &\quad 231 + 154 + 132 + 154 + 72 \\
 &= 52 + \frac{308}{308} \\
 &= 52 + \frac{712}{308} = 52 + 2\frac{137}{77} = 54\frac{137}{77}.
 \end{aligned}$$

(14)

$$6\frac{3}{4} + \frac{1}{2} \text{ of } \frac{1}{3} \text{ of } 10 + \frac{1}{11} \text{ of } \frac{1}{11} \text{ of } 242 + 16\frac{3}{11}$$

$$= 6\frac{3}{4} + 4 + 24 + 16\frac{3}{11} = 50 + \frac{33 + 21}{77} = 50\frac{54}{77}.$$

(15)

$$111\frac{1}{11} + 22\frac{3}{11} + 3\frac{1}{11} + \frac{1}{2} \text{ of } \frac{1}{3} \text{ of } \frac{1}{4} \text{ of } \frac{1}{5} = 111 + 22 + 3$$

$$+ \frac{1}{11} + \frac{3}{11} + \frac{1}{11} + \frac{1}{11} = 136 + \frac{55 + 40 + 45 + 12}{60}$$

$$= 136 + 1\frac{53}{60} = 136 + 2\frac{1}{15} = 138\frac{2}{15}.$$

(16)

$$67\frac{7}{8} + 89\frac{9}{10} + 90\frac{11}{12} + 101\frac{13}{14} = 67 + 89 + 90 + 101$$

$$+ \frac{7}{8} + \frac{9}{10} + \frac{11}{12} + \frac{13}{14} = 41195 + 42372 + 42800 + 44440$$

$$= 347 + \frac{47080}{47080}$$

$$= 347 + 1\frac{70807}{47080} = 347 + 3\frac{25567}{47080} = 350\frac{25567}{47080}.$$

(17)

$$\frac{8\frac{1}{2}}{6\frac{1}{2}} + \frac{9\frac{3}{4}}{8\frac{3}{4}} + \frac{16\frac{1}{8}}{9\frac{7}{8}} = 1\frac{2}{3} + 1\frac{78}{37} + 1\frac{79}{110}$$

$$= 3 + \frac{315315 + 111540 + 654199}{910910}$$

$$= 3 + 1\frac{1079144}{910910} = 4\frac{1079144}{910910}.$$

(18)

$$\frac{1}{2} \text{ of } \frac{1}{3} \text{ of } 4 + 6\frac{1}{2} \text{ of } 9\frac{3}{4} + 18\frac{1}{2} + 2\frac{1}{2}$$

$$= 4 + 61\frac{3}{4} + 18\frac{1}{2} + 2\frac{1}{2} = 79 + \frac{48 + 24 + 21 + 80}{84}$$

$$= 79 + 2\frac{5}{4} = 81\frac{1}{4}.$$

(19)

$$2\frac{1}{2} + \frac{16\frac{1}{2}}{13} + \frac{7\frac{1}{2}}{8\frac{1}{2}} + \frac{1}{2} \text{ of } \frac{7}{11} \text{ of } \frac{1}{2} = 2\frac{1}{2} + 1\frac{1}{2} + 1\frac{1}{2} + \frac{1}{2}$$

$$= 4 + \frac{525 + 118}{590} = 4\frac{643}{590} = 5\frac{53}{590}.$$

(20)

$$\frac{4\frac{1}{2}}{1} \text{ of } \frac{6\frac{1}{2}}{11} + 9\frac{1}{2} + 11\frac{1}{2} + 16\frac{1}{2} + \frac{6\frac{1}{2}}{4\frac{1}{2}}$$

$$= 17\frac{1}{2} + 9\frac{1}{2} + 11\frac{1}{2} + 16\frac{1}{2} + 1\frac{1}{2}$$

$$= 54 + \frac{1071 + 1540 + 924 + 792 + 968}{1840}$$

$$= 54 + 5\frac{324}{1840} = 54 + 2\frac{81}{460} = 56\frac{81}{460}.$$

EXERCISE 41.

(1)

$$\frac{7}{11} - \frac{1}{11} = \frac{11}{11} - \frac{1}{11} = \frac{10}{11}.$$

(2)

$$\frac{4}{5} \text{ of } \frac{1}{2} - \frac{2}{3} \text{ of } \frac{1}{2} = \frac{2}{5} - \frac{1}{3} = \frac{6}{15} - \frac{5}{15} = \frac{1}{15}.$$

(3)

$$\frac{1}{11} \text{ of } 6\frac{1}{2} - \frac{1}{2} \text{ of } 2\frac{1}{2} = 1\frac{1}{2} - 1\frac{1}{2} = \frac{1358}{1358} - \frac{1358}{1358} = \frac{1358}{1358}.$$

(4)

$$169\frac{1}{2} - 23\frac{1}{2} = 168 + 1\frac{1}{2} - 23\frac{1}{2}$$

$$= 168\frac{1}{2} - 23\frac{1}{2} = 145\frac{1}{2}.$$

(5)

$$229\frac{1}{2} - 67\frac{1}{2} = 228 + 1\frac{1}{2} - 67\frac{1}{2}$$

$$= 228\frac{1}{2} - 67\frac{1}{2} = 161\frac{1}{2}.$$

(6)

$$1116\frac{1}{2} - 229\frac{1}{4} = 1115 + \frac{1}{2} - 229\frac{1}{4} \\ = 1115\frac{2}{4} - 229\frac{1}{4} = 886\frac{1}{4}.$$

(7)

$$11\frac{1}{2} - 1\frac{1}{2} = 10 + 1\frac{1}{2} - 1\frac{1}{2} \\ = 10\frac{2}{2} - 1\frac{1}{2} = 9\frac{1}{2}.$$

(8)

$$196\frac{1}{2} - \frac{14\frac{1}{2}}{16\frac{1}{2}} \text{ of } \frac{11\frac{1}{2}}{9\frac{1}{2}} = 196\frac{1}{2} - 1\frac{432}{1000} \\ = 196\frac{232}{1000} - 1\frac{432}{1000} = 195\frac{800}{1000}.$$

(9)

$$\frac{7}{8} \text{ of } \frac{1}{2} \text{ of } 18\frac{3}{4} \text{ of } 2\frac{2}{3} - \frac{7}{8} \text{ of } \frac{1}{2} \text{ of } 2\frac{1}{2} \text{ of } 2\frac{1}{6} \\ = 16 - 10\frac{1}{2} = 5\frac{1}{2}.$$

(10)

$$\frac{1}{2} + \frac{3}{4} + \frac{1}{10} - \frac{7}{11} + \frac{1}{4} - \frac{1}{17} - \frac{1}{10} \\ = \frac{1}{2} + \frac{3}{4} + \frac{1}{10} + \frac{1}{4} - (\frac{7}{11} + \frac{1}{17} + \frac{1}{10}) \\ = \frac{210 + 280 + 294 + 240}{1190 + 660 + 1683} \\ = \frac{420}{1870} \\ = \frac{1024}{420} - \frac{1648}{1870} = 2\frac{1}{10} - 1\frac{1648}{1870} \\ = 1 + 1\frac{16}{10} - 1\frac{1648}{1870} = 1\frac{16}{10} - \frac{1648}{1870} = \frac{3168}{1870}.$$

(11)

$$16\frac{1}{2} + 4\frac{3}{4} + 16\frac{1}{2} + 20\frac{1}{2} - 17\frac{1}{4} \\ = 16 + 4 + 16 + 20 - 17 + \frac{1}{2} + \frac{3}{4} + \frac{1}{2} + \frac{1}{4} - \frac{1}{4} \\ = 39 + \frac{660 + 440 + 495 + 264 - 480}{1320} \\ = 39 - \frac{1859 - 480}{1320} = 39\frac{1320}{1320} = 40\frac{520}{1320}.$$

(12)

$$\begin{aligned}
 4\frac{1}{2} \text{ of } \frac{16\frac{1}{2}}{11\frac{1}{2}} - \frac{2}{3} \text{ of } \frac{16\frac{1}{2}}{17\frac{1}{2}} &= \frac{1}{3} \text{ of } \frac{16\frac{1}{2}}{11\frac{1}{2}} - \frac{2}{3} \text{ of } \frac{16\frac{1}{2}}{17\frac{1}{2}} \\
 &= 6\frac{1}{11} - \frac{13}{17} = 5 + 1\frac{1}{11} - \frac{13}{17} \\
 &= 5\frac{170}{187} - \frac{143}{187} = 5\frac{27}{187}.
 \end{aligned}$$

(13)

$$\begin{aligned}
 \frac{1}{2} \text{ of } \frac{1}{3} \text{ of } \frac{2}{3} \text{ of } 16\frac{2}{3} - 11\frac{1}{2} + 7\frac{1}{2} + 11\frac{1}{10} - \frac{2}{3} \\
 &= 1\frac{5}{17} + 7\frac{1}{2} + 11\frac{1}{10} - (11\frac{1}{2} + \frac{2}{3}) \\
 &= 19 + \frac{50 + 1260 + 147}{1470} - \left(11 + \frac{5 + 8}{20}\right) \\
 &= 19\frac{147}{1470} - 11\frac{13}{140} = 19\frac{231}{140} - 11\frac{13}{140} = 8\frac{228}{140}.
 \end{aligned}$$

(14)

$$\begin{aligned}
 96\frac{2}{3} - \frac{1}{2} \text{ of } \frac{2}{3} \text{ of } \frac{1}{3} \text{ of } 63 + \frac{3}{11} + 18\frac{1}{2} - 17\frac{1}{3} \\
 &= 96\frac{2}{3} + \frac{3}{11} + 18\frac{1}{2} - 12 - 17\frac{1}{3} \\
 &= 114 + \frac{33 + 24 + 44}{88} - 29\frac{1}{3} = 114\frac{101}{88} - 29\frac{1}{3} \\
 &= 114\frac{319}{264} - 29\frac{88}{264} = 85\frac{231}{264}.
 \end{aligned}$$

(15)

$$\begin{aligned}
 \frac{1}{2} \text{ of } \frac{8\frac{1}{2}}{7\frac{1}{2}} - \frac{2}{11} \text{ of } \frac{6\frac{1}{2}}{8\frac{1}{2}} &= \frac{325}{342} - \frac{319}{1998} \\
 &= \frac{249865 - 140049}{221958} = \frac{109816}{221958} = \frac{54908}{110979}.
 \end{aligned}$$

(16)

$$\begin{aligned}
 4\frac{1}{2} \text{ of } 6\frac{1}{2} \text{ of } 7\frac{1}{2} - \frac{2}{3} \text{ of } 8\frac{1}{2} \text{ of } 11 &= 222\frac{1}{2} - 64\frac{2}{3} \\
 &= 222\frac{187}{36} - 64\frac{8}{9} = 158\frac{17}{36}.
 \end{aligned}$$

EXERCISE 42.

(1)

$$\frac{1}{2} \times \frac{3}{7} \times \frac{9}{11} \times \frac{4}{81} \times \frac{5}{1} = \frac{3 \times 2}{7 \times 11} = \frac{6}{77}$$

(2)

$$\frac{2}{7} \times \frac{4}{11} = \frac{2 \times 4}{7 \times 11} = \frac{8}{77}$$

(3)

$$\frac{9}{11} \times 2\frac{1}{2} \times \frac{4}{7} \times 3\frac{1}{2} = \frac{9}{11} \times \frac{9}{4} \times \frac{4}{7} \times \frac{7}{2} = \frac{3 \times 9}{11} = \frac{27}{11} = 2\frac{5}{11}$$

(4)

$$6\frac{3}{4} \times 4\frac{3}{11} \times 77 \times 4\frac{1}{2} = \frac{11}{7} \times \frac{47}{11} \times \frac{77}{1} \times \frac{17}{4} = \frac{11 \times 47 \times 17}{1} = 8789$$

(5)

$$3 \times 7\frac{1}{2} \times \frac{1}{18} \times 3\frac{2}{11} = \frac{3}{1} \times \frac{15}{2} \times \frac{11}{15} \times \frac{41}{11} = \frac{3 \times 41}{2} = \frac{123}{2} = 61\frac{1}{2}$$

(6)

$$\begin{aligned}
 9\frac{1}{2} \times 1\frac{1}{2} \times 2 \times \frac{1}{17} \times 3\frac{1}{2} &= \frac{19}{2} \times \frac{4}{11} \times \frac{2}{1} \times \frac{3}{17} \times \frac{24}{25} \\
 &= \frac{3 \times 3 \times 24}{11 \times 17} = \frac{108}{187} = 1\frac{20}{187}.
 \end{aligned}$$

(7)

$$\begin{aligned}
 8\frac{1}{2} \times 9\frac{1}{2} \times 10\frac{1}{2} \times \frac{1}{9\frac{1}{2}} &= \frac{35}{4} \times \frac{19}{2} \times \frac{31}{3} \times \frac{2}{19} \\
 &= \frac{35 \times 31}{4 \times 3} = \frac{1085}{12} = 90\frac{5}{12}.
 \end{aligned}$$

(8)

$$\begin{aligned}
 &\frac{1}{2} \text{ of } \frac{1}{3} \text{ of } (\frac{1}{2} + \frac{1}{3}) \times \frac{2}{11} \times \frac{7}{15} \\
 &= \frac{1}{2} \times \frac{1}{3} \times \frac{7}{8} \times \frac{2}{11} \times \frac{7}{15} = \frac{2 \times 7}{3 \times 11} = \frac{14}{33}.
 \end{aligned}$$

(9)

$$27\frac{1}{2} \times 98\frac{1}{2} = 12\frac{1}{2} \times 19\frac{1}{2} = 14\frac{1}{2} \times 28\frac{1}{2} = 2712\frac{1}{2}.$$

(10)

$$\begin{aligned}
 16\frac{1}{2} \times 8\frac{1}{2} \times \frac{17}{22} \times \frac{19}{10\frac{1}{2}} &= \frac{11}{2} \times \frac{3}{4} \times \frac{17}{22} \times \frac{19}{21} \\
 &= \frac{11 \times 3 \times 17 \times 19}{2 \times 4 \times 21} = \frac{12652}{84} = 150\frac{1}{2}.
 \end{aligned}$$

(11)

$$\begin{aligned} (11\frac{1}{2} + 6\frac{1}{2}) \times (9\frac{1}{2} - 7\frac{1}{2}) &= 17\frac{1}{2} \times 2\frac{1}{2} = \frac{143}{8} \times \frac{43}{35} \\ &= \frac{143 \times 43}{4 \times 35} = \frac{6149}{140} = 43\frac{13}{14}. \end{aligned}$$

(12)

$$\begin{aligned} \frac{4\frac{1}{2}}{7\frac{1}{2}} \times \frac{6\frac{1}{2}}{\frac{1}{2}} \times \frac{1}{2} \text{ of } 3\frac{1}{2} \text{ of } 9\frac{1}{2} &= \frac{19}{80} \times \frac{26}{1} \times \frac{1}{2} \times \frac{12}{7} \times \frac{8}{5} \\ &= \frac{19 \times 26 \times 12 \times 8}{5 \times 7 \times 5} = \frac{270\frac{1}{2}}{175} = 270\frac{1}{2}. \end{aligned}$$

(13)

$$\begin{aligned} 6\frac{1}{2} \text{ of } 8\frac{1}{2} \times 9\frac{1}{2} \text{ of } \frac{16}{8\frac{1}{2}} &= \frac{11}{7} \times \frac{16}{7} \times \frac{19}{4} \times \frac{32}{64} \\ &= \frac{11 \times 19 \times 32}{7} = \frac{6688}{7} = 955\frac{3}{7}. \end{aligned}$$

(14)

$$\begin{aligned} \frac{1}{2} \text{ of } \frac{3}{2} \text{ of } \frac{8}{7} \times \frac{2}{3} \times \frac{10}{11} \times 693 &= \frac{1}{2} \times \frac{3}{2} \times \frac{8}{7} \times \frac{2}{3} \times \frac{10}{11} \times \frac{693}{1} \\ &= \frac{3 \times 3 \times 8 \times 2}{1} = 144. \end{aligned}$$

$$\begin{array}{r} 8 \quad 7 \\ 9 \quad 21 \\ \times \frac{2}{2} \times \frac{4}{4} \end{array}$$

$$\begin{array}{r} 26 \\ 43 \quad 78 \\ \times \frac{5}{5} \times \frac{7}{7} \\ 15 \quad 5 \end{array}$$

$$4125181.$$

$$\begin{array}{r} \times 3 \\ 11 \end{array} = \frac{168}{847}.$$

(19)

$$(6\frac{1}{2} + 4\frac{1}{2} + 9\frac{1}{2}) \times (6\frac{1}{2} + 3\frac{1}{2}) \times (3\frac{1}{2} - 2\frac{1}{2})$$

$$= 20\frac{1}{2} \times 9\frac{1}{2} \times 1\frac{1}{2} = \frac{139}{20} \times \frac{359}{22} \times \frac{7}{10} = \frac{417}{20} \times \frac{713}{22} \times \frac{49}{10}$$

$$\frac{139 \times 359 \times 7}{10 \times 11 \times 15} = \frac{34287}{165} = 211\frac{1}{3}.$$

(20)

$$(8\frac{1}{2} - 2\frac{1}{2} + 3\frac{1}{2} - 7\frac{1}{2}) \times (6\frac{1}{2} - 2\frac{1}{2} + 3 + 1) \times (\frac{1}{2} \text{ of } 11\frac{1}{2} + 4)$$

$$= \{ (8\frac{1}{2} + 3\frac{1}{2}) - (2\frac{1}{2} + 7\frac{1}{2}) \}$$

$$\times \{ (6\frac{1}{2} + 2 + 1) - 2\frac{1}{2} \} \times (5\frac{1}{2} + 4)$$

$$= (11\frac{1}{2} - 9\frac{1}{2}) \times (8\frac{1}{2} - 2\frac{1}{2}) \times 6\frac{1}{2}$$

$$= 14\frac{1}{2} \times 6\frac{1}{2} \times 6\frac{1}{2} = 140\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$$

$$= 210\frac{1}{2} = 721\frac{1}{2}.$$

EXERCISE 43.

(1)

$$7 \div \frac{1}{4} = \frac{2}{7} \times \frac{11}{4} = \frac{11}{2}. \quad 7 \text{ of } 7 \div 42 = 7 \times \frac{1}{3} \times \frac{1}{2} = \frac{7}{6}.$$

(2)

(3)

$$7\frac{1}{2} \div \frac{1}{2} \text{ of } \frac{1}{2} \text{ of } 6\frac{1}{2} = \frac{59}{8} \times \frac{2}{1} \times \frac{4}{3} \times \frac{2}{13} = \frac{118}{13} = 9\frac{1}{13}.$$

H

(4)

$$\frac{2}{3} \text{ of } \frac{4}{5} \div \frac{1}{7} \text{ of } \frac{5}{8} = \frac{2}{3} \times \frac{4}{5} \times \frac{5}{8} \times \frac{7}{1} = \frac{14}{3} = 4\frac{2}{3}.$$

(5)

$$3\frac{1}{2} \text{ of } 8\frac{1}{2} \div 6\frac{1}{2} \text{ of } 5\frac{1}{2} = \frac{18}{5} \times \frac{17}{2} \times \frac{5}{32} \times \frac{7}{38} = 19\frac{1}{16}.$$

(6)

$$\frac{1}{2} \text{ of } 3\frac{1}{2} \text{ of } 9\frac{1}{2} \div \frac{6\frac{1}{2}}{9\frac{1}{2}} = \frac{1}{2} \times 3\frac{1}{2} \times \frac{19}{2} \div \frac{13}{2}$$

$$= \frac{1}{2} \times \frac{31}{2} \times \frac{19}{2} \times \frac{260}{189} = \frac{7557}{189} = 40\frac{27}{189}.$$

(7)

$$\frac{2}{3} \text{ of } 8\frac{1}{2} \text{ of } 6\frac{1}{2} \div 4\frac{1}{2} \text{ of } 2\frac{1}{2} = \frac{2}{3} \times \frac{17}{2} \times \frac{13}{4} \times \frac{4}{19} \times \frac{5}{15}$$

$$= 1\frac{1}{3} = 2\frac{1}{3}.$$

(8)

$$(\frac{1}{2} + \frac{1}{3} + \frac{1}{4} - \frac{1}{5}) \div \frac{2}{3} \text{ of } \frac{1}{2} = (2\frac{1}{10} - \frac{1}{5}) \div \frac{2}{3} \text{ of } \frac{1}{2}$$

$$= \frac{167}{140} \times \frac{5}{2} \times \frac{2}{1} = \frac{167}{70} = 2\frac{27}{70}.$$

(9)

$$\frac{4\frac{1}{2}}{8\frac{1}{2}} \div \frac{8\frac{1}{2}}{17\frac{1}{2}} = \frac{9}{17} \div \frac{1}{2} = \frac{9}{17} \times \frac{2}{1} = \frac{18}{17} = 1\frac{1}{17}.$$

Exercise 43.]

KEY.

119

(10)

$$8\frac{1}{2} \text{ of } 4\frac{1}{2} \text{ of } 6\frac{1}{2} \div 3\frac{1}{2} \text{ of } \frac{6\frac{1}{2}}{5\frac{1}{2}} = 4\frac{1}{2} \text{ of } 2\frac{1}{2} \text{ of } 2\frac{1}{2} \div 2\frac{1}{2} \text{ of } 8\frac{1}{2}$$

$$= 4\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2} \times \frac{2}{5} \times 8\frac{1}{2} = 2\frac{1}{2} \times 2\frac{1}{2} = 6\frac{1}{2}$$

(11)

$$4\frac{1}{2} \div 6\frac{1}{2} \text{ of } 7\frac{1}{2} \text{ of } 4\frac{1}{2} = \frac{17}{4} \times 7\frac{1}{2} \times \frac{1}{2} \times \frac{4}{17} = 3\frac{1}{2}$$

(12)

$$9\frac{1}{2} \text{ of } \frac{8\frac{1}{2}}{7} \div 6\frac{1}{2} \text{ of } \frac{4\frac{1}{2}}{8\frac{1}{2}} = 2\frac{1}{2} \text{ of } 2\frac{1}{2} \div 2\frac{1}{2} \text{ of } 1\frac{1}{2}$$

$$= 2\frac{1}{2} \times 2\frac{1}{2} \times \frac{2}{3} \times \frac{7}{10} = 2\frac{1}{2} = 26\frac{1}{2}$$

(13)

$$(\frac{2}{3} \text{ of } \frac{1}{2} \text{ of } 8\frac{1}{2}) \div (\frac{2}{3} \text{ of } 4\frac{1}{2} - \frac{1}{2})$$

$$= (\frac{2}{3} \text{ of } \frac{1}{2} \text{ of } 2\frac{1}{2}) \div (\frac{2}{3} - \frac{1}{2}) = \frac{3}{5} \times \frac{1}{2} \times \frac{7}{4} \times \frac{35}{143}$$

$$= 4\frac{1}{2} = 4\frac{5}{11}$$

(14)

$$8\frac{1}{2} \text{ of } 6\frac{1}{2} \text{ of } 4 \times \frac{2}{3} \text{ of } \frac{1}{2} \text{ of } \frac{1}{13} \times \frac{1}{2} \div 6\frac{1}{2} \text{ of } \frac{8\frac{1}{2}}{7\frac{1}{2}} =$$

$$\frac{7}{85} \times \frac{18}{2} \times \frac{4}{1} \times \frac{2}{3} \times \frac{4}{5} \times \frac{1}{18} \times \frac{1}{7} \times \frac{4}{27} \times \frac{8}{85} = \frac{128}{765}$$

(15)

$$9\frac{1}{2} \text{ of } 8\frac{1}{2} \text{ of } 6\frac{1}{2} \div \frac{8\frac{1}{2}}{6\frac{1}{2}} \text{ of } \frac{6\frac{1}{2}}{4\frac{1}{4}} = \frac{19}{2} \times \frac{35}{4} \times \frac{11}{7} \div \frac{119}{145} \text{ of } \frac{57}{88}$$

$$= \frac{19}{2} \times \frac{35}{4} \times \frac{11}{7} \times \frac{119}{145} \times \frac{57}{88} = \frac{128871}{464} = 277\frac{11}{16}.$$

EXERCISE 44.

(1)

$$\frac{7}{8} \text{ of } \frac{3}{4} \text{ of } £1 \text{ } 16s. \text{ } 8\frac{1}{2}d. = \frac{11}{16} \text{ of } £1 \text{ } 16s. \text{ } 8\frac{1}{2}d.$$

$$= \frac{£1 \text{ } 16s. \text{ } 8\frac{1}{2}d. \times 56}{45} = £2 \text{ } 5s. \text{ } 8\frac{1}{2}d.$$

(2)

$$3\frac{1}{2} \text{ of } 8\frac{1}{2} \text{ of } \frac{1}{3} \text{ of } \frac{1}{4} \text{ of } 4 \text{ bush. } 1 \text{ pk. } 1 \text{ pt.}$$

$$= \frac{4 \text{ bush. } 1 \text{ pk. } 1 \text{ pt.} \times 33}{8} \\ = 17 \text{ bush. } 2 \text{ pks. } 3 \text{ qts. } 0\frac{1}{2} \text{ pt.}$$

(3)

$$\frac{1}{2} \text{ of } \frac{3}{4} \text{ of } 6\frac{1}{2} \text{ of } 5\frac{1}{2} \text{ of } \frac{1}{8} \text{ of } 6 \text{ lbs. } 4 \text{ oz.} = \frac{33}{8} \text{ of } 6 \text{ lbs. } 4 \text{ oz.}$$

$$= \frac{6 \text{ lbs. } 4 \text{ oz.} \times 33}{35} = 5 \text{ lbs. } 14 \text{ oz. } 4\frac{1}{2} \text{ drs.}$$

(4)

$$\frac{1}{16} \text{ of } \frac{3}{4} \text{ of } \frac{2}{3} \text{ of } 6\frac{1}{2} \text{ a.} = \frac{1}{14} \text{ of } 6 \text{ a. } 1 \text{ r.}$$

$$= \frac{6 \text{ a. } 1 \text{ r.} \times 1}{14} = 1 \text{ r. } 31 \text{ per. } 12 \text{ yds. } 8 \text{ ft. } 97\frac{1}{2} \text{ in.}$$

Exercise 44.]

KEY.

121

(5)

$$\frac{1}{2} \text{ of } \frac{1}{2} \text{ of } 11 \text{ cwt. } 1 \text{ qr. } 11 \text{ lbs.} = \frac{1}{4} \text{ of } 11 \text{ cwt. } 1 \text{ qr. } 11 \text{ lbs.}$$

$$= \frac{11 \text{ cwt. } 1 \text{ qr. } 11 \text{ lbs.} \times 2}{7} = 3 \text{ cwt. } 24 \text{ lbs. } 9 \text{ oz. } 2\frac{1}{2} \text{ drs.}$$

(6)

$$\frac{1}{2} \text{ of } \frac{1}{2} \text{ of } \frac{1}{2} \text{ of } 3 \text{ a. } 1 \text{ r. } 27 \text{ per.} = \frac{1}{8} \text{ of } 3 \text{ a. } 1 \text{ r. } 27 \text{ per.}$$

$$= \frac{3 \text{ a. } 1 \text{ r. } 27 \text{ per.} \times 22}{35} = 2 \text{ a. } 23 \text{ per. } 25 \text{ yds. } 83\frac{1}{2} \text{ in.}$$

(7)

$$6\frac{1}{2} \text{ of } \frac{1}{11} \text{ of } \frac{1}{11} \text{ of } £8 \text{ } 11\text{s. } 4\frac{1}{2}\text{d.} = \frac{9}{11} \text{ of } £8 \text{ } 11\text{s. } 4\frac{1}{2}\text{d.}$$

$$= \frac{£8 \text{ } 11\text{s. } 4\frac{1}{2}\text{d.} \times 9}{16} = £3 \text{ } 13\text{s. } 10\frac{1}{2}\text{d. } \frac{1}{16} \text{ far.}$$

(8)

$$6\frac{1}{2} \text{ of } 11\frac{1}{2} \text{ of } 2\frac{1}{2} \text{ of } \frac{1}{2} \text{ of } 7 \text{ m. } 4 \text{ fur. } 17 \text{ per.}$$

$$= \frac{2025}{32} \text{ of } 7 \text{ m. } 4 \text{ fur. } 17 \text{ per.} = \frac{7 \text{ m. } 4 \text{ fur. } 17 \text{ per.} \times 2025}{32}$$

$$= 477 \text{ m. } 7 \text{ fur. } 30 \text{ per. } 4 \text{ yds. } 10\frac{1}{2} \text{ in.}$$

(9)

$$\frac{1}{2} \text{ of } \frac{1}{11} \text{ of } 3 \text{ lbs. } 5 \text{ oz.} + 6\frac{1}{2} \text{ of } \frac{1}{11} \text{ of } 6 \text{ lbs. } 11 \text{ oz.}$$

$$= \frac{1}{22} \text{ of } 3 \text{ lbs. } 5 \text{ oz.} + \frac{1}{11} \text{ of } 6 \text{ lbs. } 11 \text{ oz.}$$

$$= \frac{3 \text{ lbs. } 5 \text{ oz.} \times 7}{22} + \frac{6 \text{ lbs. } 11 \text{ oz.} \times 11}{4}$$

$$= 1 \text{ lb. } 13\frac{2}{11} \text{ drs.} + 18 \text{ lbs. } 6 \text{ oz. } 4 \text{ drs.}$$

$$= 19 \text{ lbs. } 7 \text{ oz. } 1\frac{2}{11} \text{ drs.}$$

(10)

$$\begin{aligned}
 & 2\frac{1}{2} \text{ of } \frac{1}{7} \text{ of 6 lbs. 11 oz. 4 drs. 1 scr. 16 grs.} \\
 & \quad 6 \text{ lbs. 11 oz. 4 drs. 1 scr. 16 grs.} \times 77 \\
 & = \frac{\quad}{20} \\
 & = 26 \text{ lbs. 9 oz. 6 drs. } 6\frac{1}{2} \text{ grs.}
 \end{aligned}$$

(11)

$$\begin{aligned}
 & 4\frac{1}{2} \text{ of } 5\frac{1}{2} \text{ of } \frac{7}{17} \text{ of } \frac{6}{11} \text{ of 4 yds. 3 qrs. 2 na.} \\
 & \quad 4 \text{ yds. 3 qrs. 2 na.} \times 21 \\
 & = \frac{\quad}{4} = 25 \text{ yds. 2 qrs. 1 na. } 1\frac{1}{2} \text{ in.}
 \end{aligned}$$

(12)

$$\begin{aligned}
 & 7\frac{1}{4} \text{ of } \frac{1}{14\frac{1}{2}} \text{ of } 6\frac{3}{4} \text{ of 2 qrs. 17 lbs. 4 oz.} \\
 & \quad 2 \text{ qrs. 17 lbs. 4 oz.} \times 69 \\
 & = \frac{\quad}{22} = 2 \text{ cwt. 10 lbs. 14 oz. } 11\frac{7}{11} \text{ drs.}
 \end{aligned}$$

(13)

$$\begin{aligned}
 & \frac{7}{8} \text{ of } 6\frac{1}{4} \text{ of } \frac{1}{2}\frac{2}{3} \text{ of 21 bush. 3 pks.} \\
 & \quad 21 \text{ bush. 3 pks.} \times 14 \\
 & = \frac{\quad}{9} = 33 \text{ bush. 3 pks. 2 qts. } 1\frac{1}{2} \text{ pts.}
 \end{aligned}$$

(14)

$$\begin{aligned}
 & \frac{6}{11} \text{ of } 3\frac{1}{4} \text{ of } \frac{7}{11} \text{ of } \frac{1}{2}\frac{1}{3} \text{ of } \frac{6\frac{1}{2}}{7\frac{1}{2}} \text{ of 7 wks. 4 d. 5 h.} \\
 & \quad 7 \text{ wks. 4 d. 5 h.} \times 175 \\
 & = \frac{\quad}{228} = 5 \text{ wks. 5 d. 20 hrs. 9 min. } 12\frac{1}{2}\frac{1}{3} \text{ sec.}
 \end{aligned}$$

(15)

$$\begin{aligned}
 & 21 \text{ lbs. 11 oz. 7 dwt.} \div \frac{2}{3} \text{ of } \frac{1}{4} \text{ of } 17\frac{1}{2} \\
 & = 21 \text{ lbs. 11 oz. 7 dwt.} \div 12 = 1 \text{ lb. 9 oz. 18 dwt. 22 grs.}
 \end{aligned}$$

(16)

$$4 \text{ a. } 6 \text{ per. } 5 \text{ yds. } \div 5\frac{1}{2} \times \frac{7}{8} \times \frac{11}{12} = 4 \text{ a. } 6 \text{ per. } 5 \text{ yds. } \div \frac{7}{8}$$

$$= \frac{4 \text{ a. } 6 \text{ per. } 5 \text{ yds. } \times 7}{8} \quad 28 \text{ a. } 1 \text{ r. } 3 \text{ per. } 4 \text{ yds. } 6 \text{ ft. } 108 \text{ in.}$$

$$= 3 \text{ a. } 2 \text{ r. } 5 \text{ per. } 11 \text{ yds. } 8 \text{ ft. } 63 \text{ in.}$$

(17)

$$£169 \text{ 4s. } 11\frac{1}{2} \text{ d. } \div 3\frac{1}{2} \text{ of } 6\frac{1}{2} \text{ of } \frac{1}{16} = £169 \text{ 4s. } 11\frac{1}{2} \text{ d. } \div \frac{1}{16}$$

$$= \frac{£169 \text{ 4s. } 11\frac{1}{2} \text{ d. } \times 4}{55} = £12 \text{ 6s. } 2\frac{3}{4} \text{ d.}$$

(18)

$$11 \text{ cwt. } 2 \text{ qrs. } 17 \text{ lbs. } \times 6\frac{1}{2} \text{ of } 4\frac{1}{2} \text{ of } \frac{1}{127}$$

$$= \frac{11 \text{ cwt. } 2 \text{ qrs. } 17 \text{ lbs. } \times 783}{3556}$$

$$= 2 \text{ cwt. } 2 \text{ qrs. } 6 \text{ lbs. } 15 \text{ oz. } 6\frac{1}{2} \text{ drs.}$$

EXERCISE 47.

(1)

$$\begin{array}{r} 18 \cdot 716 \\ 967 \\ 34 \cdot 71 \\ \cdot 271 \\ 698 \cdot 7149 \\ 23 \cdot 0067 \\ \hline 1742 \cdot 4186 \end{array}$$

(2)

$$\begin{array}{r} 278 \cdot 714 \\ 61 \cdot 9134 \\ 217 \cdot 8167 \\ 23 \cdot 7146 \\ 678 \cdot 906 \\ 12 \cdot 98678 \\ \hline 1274 \cdot 05148 \end{array}$$

(3)

$$\begin{array}{r} 216 \cdot 714763 \\ 2 \cdot 9 \\ 9867 \cdot \\ 91 \cdot 0986 \\ 7 \cdot 81645 \\ \cdot 09868 \\ \hline 10185 \cdot 628493 \end{array}$$

(4)	(5)	(6)
26.1111	.9167	9.64
11.22222	9.9	9111.77
34.546	8.98	967.769
17.19186	7.614	463.
11.127	.0986	7.0009
816.7142	17.	8.61
<hr/>	19.11	911.1257
916.91238	963.714	<hr/>
	1027.3333	11478.9156

(7)	(8)	(9)
167.914	9161.0098	71.0916714
6.8147	7149.16716	27.1471
<hr/>	<hr/>	<hr/>
161.0998	2011.84264	43.9445714

(10)	(11)	(12)
111.1116	279.00906	627.4
22.22222	117.916	91.7469
<hr/>	<hr/>	<hr/>
88.88938	161.09306	535.6531

EXERCISE 48.

(1)

$78417 \times 9 = 705753$, and, since there are three decimal places in the multiplicand and none in the multiplier, the answer is 705.753.

(2)

$271 \times 34 = 9214$, and, as the decimal places in the multiplier and multiplicand number 2, we point off two places in the product and therefore the answer is 92.14.

(8)

9.64

1.77

7.769

3.

7.0009

8.61

1.1257

78.9156

(8)

$21716 \times 206 = 4473496$, and, since the decimal places in multiplier and multiplicand number 5, the answer is 44.73496.

(4)

$11007 \times 678 = 7462746$, and, since the decimal places in the multiplier and multiplicand number 8, there must be the same number in the product; the number therefore is .07462746.

(5)

$116791 \times 8100004 = 946007567164$, and, since the decimal places in the multiplier, together with those of the multiplicand, number 8, the answer is 9460.07567164.

(6)

$11111 \times 97116 = 1079055876$, and, since the decimal places in the multiplier, together with the multiplicand, number 7, the answer is 107.9055876.

(7)

$27 \times 14 \times 119 = 44982$, and, as in the three factors together, there are four decimal places, the answer is 4.4982.

(8)

$342 \times 61 \times 79 = 1648098$, and, since there are nine decimal places in the three factors together, the answer is .001648098.

(9)

$411467 \times 61 \times 27 = 677686149$, and, since there are six decimal places in the three factors together, the product is 677.686149.

(10)

$8008 \times 66 \times 2002 = 1058113056$, and, since there are five decimal places in the three factors together, the product is 10581.13056 .

(11)

$1012 \times 719 = 727628$, and, since the decimal places in the multiplier, together with the multiplicand, number 8, the answer is $.00727628$.

(12)

$2 \times 7 \times 6 \times 41 = 3444$, and, since there are seven decimal places in the four factors together, the answer is $.0003444$.

EXERCISE 49.

(1)

$$78.1 \div 1.071 = 78100 \div 1071 = 72.922, \&c.$$

(2)

$$91.142 \div 7.8 = 911.42 \div 78 = 11.684, \&c.$$

(3)

$$61.123 \div .0146 = 611230 \div 146 = 4186.506, \&c.$$

(4)

$$9.1234 \div .000716 = 9123400 \div 716 = 12742.178, \&c.$$

(5)

$$.0467 \div .01471 = 4670 \div 1471 = 3.174, \&c.$$

(6)

$$918 \div 914.71 = 91800 \div 91471 = 1.003, \&c.$$

(7)

$$967.104 \div 12.046 = 967104 \div 12046 = 80.284, \&c.$$

(8)

$$91.671 \div .000918 = 91671000 = 916 = 100077.5109, \&c.$$

(9)

$$8.8 \div .0641 = 88000 \div 641 = 137.285, \&c.$$

(10)

$$7147.12 \div 1127 = 6.341, \&c.$$

(11)

$$.817 \div .9147 = 8170 \div 9147 = .893, \&c.$$

(12)

$$213 \div 91.614 = 213000 \div 91614 = 2.324, \&c.$$

EXERCISE 51.

(4)

$$\begin{aligned} \therefore \quad .126 &= \frac{126-1}{990} = \frac{125}{990} = \frac{25}{198}; \quad \therefore \quad .214 = \frac{214-2}{990} \\ &= \frac{212}{990} = \frac{106}{495}. \end{aligned}$$

(5)

$$\begin{aligned} \therefore \quad .2134 &= \frac{2132-21}{9900} = \frac{2111}{9900}; \quad .216 = \frac{216-21}{900} \\ &= \frac{195}{900} = \frac{13}{60}. \end{aligned}$$

$$\therefore \quad .2114 = \frac{2114-21}{9900} = \frac{2093}{9900}.$$

(6)

$$\therefore \quad .12345 = \frac{12345-123}{99000} = \frac{12222}{99000} = \frac{277}{2250}; \quad .1678 = \frac{1678}{9999}.$$

(7)

$$\begin{aligned} \cdot 6714 &= \frac{8714 - 671}{9000} = \frac{8043}{9000}; \quad \cdot 12716 = \frac{12716 - 12}{99900} \\ &= \frac{12704}{99900} = \frac{3176}{24975}. \end{aligned}$$

(8)

$$\begin{aligned} \cdot 9186 &= \frac{9186 - 91}{9900} = \frac{9095}{9900} = \frac{1819}{1980}; \quad 142 = \frac{142 - 1}{990} \\ &= \frac{141}{990} = \frac{47}{330}. \end{aligned}$$

(9)

$$\begin{aligned} \cdot 12347 &= \frac{12347 - 1234}{90000} = \frac{11113}{90000}; \quad \cdot 1278 = \frac{1278 - 12}{9900} \\ &= \frac{1266}{9900} = \frac{211}{1650}. \end{aligned}$$

(10)

$$\begin{aligned} \cdot 16714 &= \frac{16714 - 16}{99900} = \frac{16698}{99900} = \frac{2783}{16650}; \\ \cdot 9 &= \frac{9}{9} = 1; \quad \cdot 86 = \frac{86}{99}. \end{aligned}$$

(11)

$$27 \cdot 43 = 2743; \quad 17 \cdot 816 = 17816 = 17816 = 17816$$

(12)

$$\begin{aligned} 467 \cdot 12345 &= 46712345 = 46712345 = 46712345. \\ 16 \cdot 16161 &= 1616161 = 1616161 = 1616161. \end{aligned}$$

EXERCISE 52.

(1)

$$\cdot\dot{9} = \frac{9}{10} = 1, \cdot\dot{65} = \frac{65-6}{90} = \frac{59}{90}.$$

$$\text{Hence } \cdot\dot{9} + \cdot\dot{65} = 1 + \frac{59}{90} = 1\frac{59}{90}.$$

(2)

$$\begin{aligned} 9\cdot\ddot{12} &= 9\frac{1}{10}; \cdot\ddot{725} = \frac{725}{1000}; \text{ hence } 9\cdot\ddot{12} + \cdot\ddot{725} \\ &= 9\frac{1}{10} + \frac{725}{1000} = 9\frac{100}{1000} + \frac{725}{1000} = 9\frac{825}{1000}. \end{aligned}$$

(3)

$$\begin{aligned} 6\cdot\dot{14} &= 6\frac{14}{100}, 2\cdot\dot{714} = 2\frac{714}{1000}; \text{ hence } 6\cdot\dot{14} - 2\cdot\dot{714} \\ &= 6\frac{14}{100} - 2\frac{714}{1000} = 6\frac{140}{1000} - 2\frac{714}{1000} = 4\frac{686}{1000} \\ &= 4\frac{343}{500} = 4\frac{343}{500}. \end{aligned}$$

(4)

$$\begin{aligned} 7\cdot\dot{9186} &= 7\frac{9186}{10000}, 2\cdot\dot{347} = 2\frac{347}{1000}; \text{ hence } 7\cdot\dot{9186} - 2\cdot\dot{347} \\ &= 7\frac{9186}{10000} - 2\frac{347}{1000} = 7\frac{9186}{10000} - 2\frac{3470}{10000} = 5\frac{5716}{10000}. \end{aligned}$$

(5)

$$7\cdot\dot{5} = 7\frac{5}{10}, 1\cdot\dot{23} = 1\frac{23}{100}, 7\cdot\dot{191} = 7\frac{191}{100}.$$

$$\begin{aligned} \text{Hence } 7\cdot\dot{5} + 1\cdot\dot{23} + 7\cdot\dot{191} &= 7\frac{5}{10} + 1\frac{23}{100} + 7\frac{191}{100} \\ &= 7 + 1 + 7 + \frac{5}{10} + \frac{23}{100} + \frac{191}{100} = 15 + \frac{50}{100} + \frac{214}{100} \\ &= 15\frac{264}{100} = 15\frac{33}{125}. \end{aligned}$$

(6)

$$\begin{aligned} \cdot\dot{7} &= \frac{7}{10}, \cdot\ddot{12} = \frac{12}{100}, \cdot\ddot{67} = \frac{67}{1000}; \text{ hence } \cdot\dot{7} \times \cdot\ddot{12} \times \cdot\ddot{67} \\ &= \frac{7}{10} \times \frac{12}{100} \times \frac{67}{1000} = \frac{5628}{100000}. \end{aligned}$$

(7)

$$\cdot 6\dot{7} = \frac{67}{10}; \cdot 9\dot{1}\dot{4} = \frac{914}{100} = \frac{457}{50}; \text{hence } \cdot 6\dot{7} \times \cdot 9\dot{1}\dot{4} = \frac{67}{10} \times \frac{457}{50} = \frac{30619}{500}.$$

(8)

$$6\cdot 7\dot{1} = 6\frac{71}{10}, 6\cdot 7\dot{1}\dot{3} = 6\frac{713}{100}; \text{hence } 6\cdot 7\dot{1} \times 6\cdot 7\dot{1}\dot{3} = 6\frac{71}{10} \times 6\frac{713}{100} = \frac{302}{10} \times \frac{3323}{100} = \frac{1003646}{22275} = 45\frac{1171}{22275}.$$

(9)

$$\cdot 6\dot{1}\dot{4} = \frac{614}{100}, 2\cdot 76\ddot{6} = 2\frac{766}{100}; \text{hence } \cdot 6\dot{1}\dot{4} \div 2\cdot 76\ddot{6} = \frac{614}{100} \div \frac{2766}{100} = \frac{614}{2766} = \frac{307}{1383} = \frac{307}{33} \times \frac{10}{11} = \frac{6140}{2766}.$$

(10)

$$1\cdot 647 = 1\frac{647}{1000}; 3\cdot 52\dot{1} = 3\frac{521}{100}; \text{hence } 1\cdot 647 \div 3\cdot 52\dot{1} = \frac{1647}{1000} \div \frac{521}{100} = \frac{1647}{5210} \times \frac{100}{100} = \frac{1647}{521} \times \frac{10}{100} = \frac{1647}{5210}.$$

EXERCISE 53.

(1)

2 days 7 hrs.
24)7 hrs.

7)2.2916 days

327380952 wk.

(2)

7 oz. 4 dwt. 9 grs.

24)9 grs.

20)4.375 dwt.

12)7.21875 oz.

6015625 lb.

(3)

16 lbs. 7 oz. 3 drs.

16)3 drs.

16)7.1875 oz.

100)16.44921875 lbs.

16449218 cwt.

(4)

116 days 14 hrs.

24)14 hrs.

3654)116.583 days

31918777 year.

(5)

1 rood 17 yds.

1210)17 yds.

4)1·01404959 roods

·25351239 acre.

(6)

3 qrs. 1 na. 1 in.

24)1 inch

4)1·444 nails

6)3·3611 qrs.

·56018 F. E.

(7)

16s. 11½d.

4)2 far.

12)11·5 d.

20)16·9583 s.

·8479166

(8)

£9 14s. 8½d. = 4673 half-pence

£77 0s. 9d. = 36978 half-pence

4673 ÷ 36978 = ·12637

(9)

2 days 17 min. = 2897 min.

7 wks. 4 days = 76320 min.

2897 ÷ 76320 = ·0379585.

(10)

3 fur. 17 per. = 4521 half-feet.

2 miles 4 yds. 1 ft. = 21146 half-feet.

4521 ÷ 21146 = ·2137993.

(11)

17 lbs. 4 oz. = 4992 scr.

19 lbs. 7 oz. 5 drs. 1 scr. = 5656 scr.

4992 ÷ 5656 = ·8826025.

year.

(12)

2 reeds 27 yds. = 9788 quarter-yards.

29 per. 29 yds. = 3625 quarter-yards.

 $9788 \div 3625 = 2.7001379$

EXERCISE 54.

(1)

£.146785

20

2 | .935700 s.

12

11 | .228400 d.

4

0 | .913600 f.

2s. 11d. .9136 f.

(2)

.71463 week

7

5 | .00241 days

24

0 | .05784 hrs.

60

3 | .47040 min.

60

28 | .22400 sec.

5 days 3 min. 28.224 sec.

(3)

2 | .147 lb.

12

1 | .764 oz.

8

6 | .112 drs.

3

0 | .336 scr.

20

6 | .720 grs.

2 lbs. 1 oz. 6 drs. 6.72 grs.

(4)

.6143 miles

8

4 | .9144 far.

40

36 | .5760 per.

5½

3 | .1680 yds.

3

0 | .5040 ft.

12

6 | .0480 in.

4 fur. 36 per. 3 yds. 6.048 in.

Exercise 54.]

KEY.

133

(5)

·916147 acre

4

3 | ·664588 rood.

40

26 | ·583520 per.

30½

17 | ·651480 yd.

9

5 | ·863320 ft.

144

124 | ·318080 inches.

3 roods 26 per. 17 yds. 5 feet 124·31808 in.

(6)

2 | ·14617 Fr. ells.

6

(7)

9 | ·2645 hrs.

60

0 | ·87702 qrs.

4

15 | ·8700 min.

60

3 | ·50808 na.

2½

52 | ·2000 sec.

9 hrs. 15 min. 52·2 sec.

1 | ·14318 in.

2 Fr. ells 3 na. 1·14318 in.

(8)

$$4 \mid \cdot 7177 \text{ hhd.}$$

 2

$$1 \mid \cdot 4354 \text{ brl.}$$

 31½

$$13 \mid \cdot 7151 \text{ gal.}$$

 4

$$2 \mid \cdot 8604 \text{ qts.}$$

 2

$$1 \mid \cdot 7208 \text{ pts.}$$

4 hhd. 1 brl. 13 gal. 2 qts. 1·7208 pts.

(9)

$$3 \mid \cdot 33625 \text{ roods.}$$

 40

$$13 \mid \cdot 45000 \text{ per.}$$

 30½

$$13 \mid \cdot 61250 \text{ yds.}$$

 9

$$5 \mid \cdot 51250 \text{ ft.}$$

 144

$$73 \mid \cdot 80000 \text{ in.}$$

3 roods 13 per. 13 yds. 5 ft. 73·8 in.

Exercise 54.]

KEY.

135

(10)

$$9 \mid \cdot 914 \text{ pound}$$

$$20$$

$$18 \mid 280 \text{ s.}$$

$$12$$

$$3 \mid \cdot 360 \text{ d.}$$

$$4$$

$$1 \mid \cdot 440 \text{ far.}$$

$$\text{£}9 \text{ } 18\text{s } 3\frac{1}{4}\text{d } \cdot 44 \text{ far.}$$

(11)

$$\text{£}3 \text{ } 4\text{s } 7\frac{1}{4}\text{d} = \text{£}3 \cdot 23125.$$

$$\text{£}3 \cdot 23125 \times 6 \cdot 714 = \text{£}21 \cdot 6946125.$$

$$\text{£}21) \cdot 6946125$$

$$20$$

$$13 \mid \cdot 8922500 \text{ s.}$$

$$12$$

$$10 \mid \cdot 7070000 \text{ d.}$$

$$4$$

$$2 \mid \cdot 8280000 \text{ far.}$$

$$\text{£}21 \text{ } 13\text{s } 10\frac{1}{4}\text{d } \cdot 828 \text{ far.}$$

(12)

$$9 \mid \cdot 1467 \text{ years}$$

$$365\frac{1}{4}$$

$$53 \mid \cdot 582175 \text{ days}$$

$$24$$

$$13 \mid \cdot 972200 \text{ hrs.}$$

$$60$$

$$58 \mid \cdot 332000 \text{ min.}$$

$$60$$

$$19 \mid \cdot 92000 \text{ sec.}$$

9 years 53 days 13 hrs. 58 min. 19·92 sec.

(13)

$$\$2.78 \times .12345 = \$0.343191.$$

(14)

$$27 \text{ sq. yds. } 2 \text{ ft.} = 245 \text{ ft.}$$

$$245 \text{ sq. ft.} \times .65265 = 159.89925 \text{ sq. ft.}$$

$$159.89925 \text{ sq. ft.} = 17 \text{ sq. yds. } 6.89925 \text{ sq. ft.}$$

144

$$129.492 \text{ sq. in.}$$

$$17 \text{ sq. yds. } 6 \text{ ft. } 129.492 \text{ in.}$$

(15)

$$7 \text{ cwt. } 2 \text{ qr. } 17 \text{ lbs.} = 767 \text{ lbs.}$$

$$767 \times 7.46725 = 5727.38075 \text{ lbs.}$$

$$5727.38075 \text{ lbs.} = 2 \text{ tons } 17 \text{ cwt. } 1 \text{ qr. } 2.38075 \text{ lbs.}$$

(16)

$$£7 \text{ } 7\text{s } 7\frac{1}{2}\text{d} = £7.38125.$$

$$£7.38125 \times 6.4715 = £47.767759375.$$

$$£47 \mid .767759375$$

20

$$15 \mid .355187500$$

12

$$4 \mid .262250000$$

4

$$1 \mid .049000000$$

$$£49 \text{ } 15\text{s } 4\frac{1}{2}\text{d} .049 \text{ far.}$$

Exercises 54, 55.]

KEY.

137

EXERCISE 55.

(1)

$$£297 \times 400 = 118800$$

$$4s \times 20 = 80$$

$$8\frac{1}{2}d = 34 \text{ far.} \times 5 \div 12 = 14\frac{1}{2}$$

$$£297 \text{ } 4s \text{ } 8\frac{1}{2}d = \$1188.94\frac{1}{2}$$

$$\$1188.94\frac{1}{2} = \$1188.9416$$

$$\$1188.9416 \div .0005 = \$11889416.6 \div 5$$

$$= \$2377883.333$$

(2)

$$\text{Assume 22) } 9 \dots 11 \dots 18 \dots 15 \dots 21 \dots 22 \dots 42 \dots 36 \dots 60$$

$$\text{Assume 30) } \underline{\hspace{10em}} \quad \quad \quad 21 \dots 18 \dots 30$$

$$7 \dots 3$$

$$1. \text{ c. m.} = 22 \times 30 \times 7 \times 3 = 13860$$

(3)

$$\$78.90 + \$427.43 + \$209.17 + \$80.43 + \$17.90 = \$813.83$$

$$£183 \text{ } 15s \text{ } 11\frac{1}{2}d = \$735.18\frac{1}{2}$$

$$\$813.83 - \$735.18\frac{1}{2} = \$78.64\frac{1}{2}$$

(4)

$$1. \text{ c. m. of } 2, 7, 11, 5, \text{ and } 10 = 770.$$

$$770 \div 2 = 385; 770 \div 7 = 110; 770 \div 11 = 70;$$

$$770 \div 5 = 154; 770 \div 10 = 77.$$

$$1 \times 385 \quad \quad \quad 4 \times 110$$

$$\frac{1}{2} = \frac{\quad}{2 \times 385} = \frac{385}{770}; \frac{1}{4} = \frac{\quad}{4 \times 110} = \frac{110}{440};$$

$$3 \times 70 \quad \quad \quad 7 \times 110$$

$$\frac{3}{11} = \frac{\quad}{11 \times 70} = \frac{210}{770}; \frac{3}{7} = \frac{\quad}{7 \times 154} = \frac{308}{770};$$

$$7 \times 77$$

$$\frac{7}{10} = \frac{\quad}{10 \times 77} = \frac{539}{770}.$$

(5)

$$£24s\ 10\frac{1}{2}d \times 6 = £13\ 9s\ 1\frac{1}{2}d$$

19

$$£22\ 8\ 6\frac{1}{2} \times 2 = 44\ 17\ 1$$

10

$$£224\ 5\ 5 \times 7 = 1569\ 17\ 11$$

$$\text{Sum} = £1628\ 4\ 1\frac{1}{2}$$

(6)

$$44\ \text{miles} \div 13\ \text{ft. } 7\ \text{in.}$$

$$44\ \text{miles} = 2787840\ \text{inches, and } 13\ \text{ft. } 7\ \text{in.} = 163\ \text{in.}$$

$$2787840 \div 163 = 17103\frac{11}{163}\ \text{times.}$$

(7)

From \$7498.70 take away \$749.83 and the remainder

$$\$6748.87 = \text{three times the share of B or C.}$$

$$\text{Hence share of B or C} = \$6748.87 \div 3 = \$2249.62\frac{1}{3},$$

$$\text{and share of A} = \$2249.62\frac{1}{3} + \$749.83 = \$2999.45\frac{1}{3}.$$

(8)

\$6880

9775

6750

58877

9105

8750

9880

58712

 \$168729

(9)

\$2702

3537

3830

2156

3156

10688

25561

 \$49630

From \$168729

Take 51630

 Rem. 117099

(10)

$$\frac{1}{2} \times \frac{1}{3} \times \frac{1}{4} \times \$28.28 = \$236.34.$$

$$£6 \text{ 11s } 5\frac{1}{2}\text{d} = \$26.29\frac{1}{2}.$$

$$\cdot 7 \text{ of } 2 \cdot 4 \text{ of } 3 \cdot 7 \text{ of } \frac{3}{4} \text{ of } \$26.29\frac{1}{2}$$

$$= \frac{7}{10} \times \frac{24}{10} \times \frac{84}{9} \times \frac{25}{84} \times \frac{\$157.75}{8} = \frac{\$1104.24}{9} = \$122.69\frac{1}{3}.$$

$$\$236.34 - \$122.69\frac{1}{3} = \$113.64\frac{1}{3}.$$

(13)

$$\begin{array}{ccccccc} 9 & 32 & 9 & & 23 & 31 & 4 \\ 27 \times 45 \times 64 \times 117 \times 25 \times 115 \times 93 \times 144 \\ \hline 25 \times 729 \times 184 \times 27 \times 12 \times 18 \\ 5 & 81 & 48 & & & & \\ & 9 & 2 & & & & \\ & 3 & & & & & \end{array}$$

$$32 \times 23 \times 31 = 22816.$$

(14)

$$\frac{1}{2} \text{ of } \frac{1}{3} \text{ of } \frac{1}{4} \text{ of } 37\frac{1}{2} = \frac{1}{2} \times \frac{3}{7} \times \frac{7}{11} \times \frac{75}{2} = \frac{225}{44} = 5\frac{5}{44}.$$

$$\begin{aligned} 2\frac{1}{2} + 5\frac{5}{44} + \frac{3}{8} + 8\frac{1}{2} &= 15 + \frac{1}{4} + \frac{1}{44} + \frac{3}{8} + \frac{1}{2} \\ &= 15 + \frac{11}{44} + \frac{3}{44} + \frac{12}{44} + \frac{11}{44} = 15 + \frac{27}{11} \\ &= 15 + 2\frac{5}{11} = 17\frac{5}{11}. \end{aligned}$$

$$\begin{aligned} \frac{2}{3} + 4\frac{3}{8} &= 4 + \frac{2}{3} + \frac{3}{8} = 4 + \frac{16}{24} + \frac{9}{24} = 4\frac{25}{24} = 4\frac{1}{24} \text{ to be subtr.} \\ 16\frac{5}{11} - 4\frac{1}{24} &= 16\frac{120}{264} - 4\frac{11}{264} = 12\frac{109}{264} = 12\frac{6}{7}. \end{aligned}$$

$$\begin{aligned} & \text{(15)} \\ 2 \text{ days } 4 \text{ hrs.} &= 52 \text{ hrs.}; 3 \text{ wks. } 3 \text{ days} = 576 \text{ hrs.} \\ 52 \div 576 &= .0902777. \end{aligned}$$

$$\begin{aligned} & \text{(16)} \\ 17810)63294(3 \\ & \quad 53430 \\ & \quad \hline \end{aligned}$$

$$\begin{aligned} & \quad 9864)17810(1 \\ & \quad \quad 9864 \\ & \quad \quad \hline \end{aligned}$$

$$\begin{aligned} & \quad \quad 7946)9864(1 \\ & \quad \quad \quad 7946 \\ & \quad \quad \quad \hline \end{aligned}$$

$$\begin{aligned} & \quad \quad \quad 1918)7946(4 \\ & \quad \quad \quad \quad 7672 \\ & \quad \quad \quad \quad \hline \end{aligned}$$

$$\begin{aligned} & \quad \quad \quad \quad 274)1918(7 \\ & \quad \quad \quad \quad \quad 1918 \\ & \quad \quad \quad \quad \quad \hline \end{aligned}$$

$$\text{G. C. M.} = 274.$$

$$\begin{aligned} & \text{(17)} \\ \cdot 7 = \frac{7}{9}; \cdot 93 = \frac{93}{99} = \frac{31}{33}; \cdot 00045 &= \frac{45}{99999} = \frac{5}{11111} \\ \cdot 27146 &= \frac{27146-27}{99900} = \frac{27119}{99900} \end{aligned}$$

$$\begin{aligned} & \text{(18)} \\ \text{acre.} & \quad \text{rood.} \quad \text{per.} \quad \text{yds.} \\ 2 & \quad 1 \quad 17 \quad 9 \\ 4 & \quad \quad \quad \quad \end{aligned}$$

$$\begin{aligned} & \quad 9 \text{ roods.} \\ & \quad 40 \end{aligned}$$

$$\begin{aligned} & \quad 377 \text{ per.} \quad 11413\frac{1}{4} \text{ yds.} \\ & \quad 30\frac{1}{4} \quad \quad \quad 9 \end{aligned}$$

$$\begin{aligned} & \quad 11319 \quad 102719\frac{1}{4} \text{ ft.} \\ & \quad 94\frac{1}{4} \quad \quad \quad 144 \end{aligned}$$

$$\begin{aligned} & \quad 11413\frac{1}{4} \text{ yds.} \quad 14791572 \text{ inches.} \end{aligned}$$

576 hrs.

18(7
18
= 274.
5
= 11111

s.

t.

ches.

Exercise 55.]

KEY.

141

(19)

·7149625 miles.

8

5)·7197000 fur.

40

28)·7880000 per.

5½

4)·3340000 yds.

3

1)·0020000 ft.

12

9)·0240000 in.

5 fur. 28 per. 4 yds. 1 ft. 0·024 in.

(20)

·7 per × 5½ = 3·85 yds. + ·625 yds. = 4·475 yds.

4·475 yds. = 4 yds. 1·425 ft; 4 yds. 1·425 ft. + ·713 ft.
= 4 yds. 2·138 ft.

4 yds. 2·138 ft. = 4 yds. 2 ft. 1·646 in.

4 yds. 2 ft. 1·646 in. + ·91 in. = 4 yds. 2 ft. 2·556

or ·7 per. × 5½ × 3 × 12 = 138·6 inches; ·625 yds.

× 3 × 12 = 22·5 in.; ·713 ft. × 12 = 8556 in.

inches.

138·6

22·5

8·556

·91

170·566 = 4 yds. 2 ft. 2·556 ins.

(21)

$$\frac{1}{18} = 4 \div 15 = 0.2666 + ; \frac{2}{47} = 9 \div 47 = 0.1915 + ;$$

$$\frac{3}{71} = 5 \div 21 = 0.2380 +$$

Therefore $\frac{1}{18}$ is greatest; and $\frac{2}{47}$ least.

(22)

$$3\frac{1}{4} \text{ Flem. E.} = 39 \text{ na. and } 1 \text{ yd.} = 16 \text{ na. } \therefore 3\frac{1}{4} \text{ Flem. E. is } \frac{3}{8} \text{ of a yd.}$$

(23)

$$\begin{aligned} \$3.73 \times 229 &= \$854.17 = \text{price of sheep} \\ £11 \text{ 11s. 7d.} \times 13 &= £150 \text{ 10s. 7d.} = \$602.11\frac{1}{2} = \text{cost of cows.} \\ \$854.17 - \$602.11\frac{1}{2} &= \$252.05\frac{1}{2} = \text{money taken home.} \end{aligned}$$

(24)

$$\begin{aligned} 623525 - 20735 &= 602790 \text{ doz.} \\ \$2487 \div 20735 &= \$0.119 + ; \$66860 \div 623525 = \\ &= \$0.107 + \end{aligned}$$

(25)

$$\begin{array}{r} \text{Assume } 24) \text{ 8} \dots 10 \dots 18 \dots 20 \dots 24 \dots 28 \dots 32 \dots 36 \dots 40 \dots 44 \\ \hline \dots \dots \dots \dots \dots 7 \dots 4 \dots 3 \dots 5 \dots 11 \\ \text{l. c. m.} = 24 \times 7 \times 4 \times 3 \times 5 \times 11 = 110880 \end{array}$$

(26)

$$\begin{aligned} 746 \text{ times } 123 &= 746 \times 123 = 91758 \text{ and } 143978 \div \\ &123 = 1170\frac{88}{123} \\ \text{Therefore } 1170\frac{88}{123} \text{ times } 123 &\text{ is } 746 \text{ times } 123. \end{aligned}$$

(27)

$$\begin{aligned} \text{Dividend} &= \text{quotient} \times \text{divisor} \\ &= 794 \times 83 = 65902 \end{aligned}$$

Exercise 55.]

KEY.

143

0.1915 + ;

3½ Flem.

1½ = cost

ken home.

23525 =

3..40..44

3.. 5..11

80

143978 ÷

(28)

lbs. oz. drs. (39 lbs 6 oz. 15½ drs.)

57

179

171

8

16

132 oz.

114

18

16

295 drs.

19

105

95

10

(29)

346 a. 1 r. 17 per. = 1676364½ yds.

2 a. 3 r. 27 per. 9 yds. = 14135½ yds.

1676364½ ÷ 14135½ = 6705457 ÷ 56543 = 118·904002

(30)

2 bush. 1 pk. 1 qt. = 73 qts.; 11 bush. 3 pks. = 376 qts.

Therefore 2 bush. 1 pk. 1 qt. = 7½ of 11 bush. 3 pk.

(31)

£217 4s. 7½d. = \$868·92½.

\$947·60 + \$207·90 + \$274·33 + \$868·92½ = \$2298·75½

\$1298·75916 ÷ 299 = \$7·688157.

(32)

$$\begin{array}{ccccccc}
 & & & & 5 & & \\
 & & & & 25 & & \\
 7 & & 8 & 11 & 33 & 125 & \\
 63 \times 47 \times 21 \times 121 \times 264 \times 625 & = & 7 \times 11 \times 5 & = & 385 & = & 8\frac{1}{8} \\
 \hline
 85 \times 81 \times 55 \times 48 \times 517 \times 40 & & 48 & & 48 & & \\
 7 & 9 & 5 & 47 & 8 & & \\
 & 8 & & & & &
 \end{array}$$

EXERCISE 56.

(5)

$$9 : 17 = 9 \div 17 = .529 ; 16 : 33 = 16 \div 33 = .484 \\ = \text{least} ; 47 : 79 = 47 \div 79 = .594 = \text{greatest.}$$

(6)

$$11 : 3 = 11 \div 3 = 3.666 = \text{greatest} ;$$

$$17 : 5 = 17 \div 5 = 3.400 ;$$

$$38 : 11 = 38 \div 11 = 3.454 ;$$

$$164 : 55 = 164 \div 55 = 2.981 = \text{least.}$$

(7)

$$49 : 5 = 49 \div 5 = 9.800 ;$$

$$176 : 16.4 = 176 \div 16.4 = 1760 \div 164 = 10.731 ;$$

$$267.4 : 25.9 = 267.4 \div 25.9 = 2674 \div 259 = 10.324 ;$$

$$8 : .89 = 8 \div .89 = 800 \div 89 = 8.988.$$

Hence greatest is 176 : 16.4 and least is 8 : .89.

(8)

$$\begin{array}{ccccccc}
 7 & 11 & 11\frac{1}{2} & 9 & 11 & 11 & \\
 \times & \times & \times & \times & = & = & \\
 4 & 2\frac{3}{2} & 9 & 1\frac{1}{2} & 2 \times 2 \times 4 & 16 & \\
 & 2 & & 2 & & &
 \end{array} = 11 : 16$$

(9)

$$\begin{array}{ccccccccccc}
 6 & 12 & 8\frac{1}{2} & 27 & 5\frac{1}{2} & 8 & 12 & 11 & 27 & & \\
 \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \\
 11 & 17 & 4\frac{1}{2} & 121 & 6 & 11 & 17 & 18 & 121 & & \\
 & & & & & & & 8 & 11 & &
 \end{array}$$

$$\begin{array}{ccccccc}
 11 & 27 & 27 & & & & \\
 \times & = & = & = & = & = & \\
 12 & 17 \times 11 & 187 & & & &
 \end{array} = 27 : 187$$

(10)

$$\frac{15}{4} \times \frac{16}{7} \times \frac{9}{20} \times \frac{10}{27} \times \frac{6}{5} = \frac{2 \times 6}{1} = \frac{12}{1} = 12:1$$

(11)

$$\frac{8}{7} \times \frac{6}{5} \times \frac{4}{3} \times \frac{2}{1} \times \frac{3}{21} = \frac{6 \times 2}{5} = \frac{12}{5} = 12:5$$

(12)

$$\frac{2}{3} \times \frac{4}{5} \times \frac{6}{7} \times \frac{8}{9} \times \frac{16}{23} = \frac{2 \times 4 \times 2 \times 8 \times 16}{5 \times 7 \times 9 \times 2 \times 23} = \frac{2048}{7245} = 2048 : 7245.$$

EXERCISE 57.

(1)

$$\frac{21 \times 40}{7} = 120$$

(2)

$$\frac{7 \times 46}{91} = \frac{46}{13} = 3\frac{7}{13}$$

(3)

$$\frac{3 \times 17}{11} = \frac{51}{11} = 4\frac{7}{11}$$

(4)

$$\frac{47 \times 29}{9} = \frac{1363}{9} = 151\frac{4}{9}$$

(5)

$$\frac{23 \times 42}{6} = 23 \times 7 = 161$$

(6)

$$\frac{21 \times 18\frac{1}{2}}{111} = \frac{7 \times 18\frac{1}{2}}{37} = \frac{7}{2} = 3\frac{1}{2}$$

$$\begin{array}{r} (7) \\ 10 \times 11 \quad 110 \\ \hline 9 \quad 9 \end{array} = 12\frac{2}{3}.$$

$$\begin{array}{r} (8) \\ 14 \times 65 \\ \hline 13 \end{array} = 14 \times 5 = 70$$

$$\begin{array}{r} (9) \\ 109 \times 72 \quad 109 \\ \hline 1728 \quad 24 \end{array} = 4\frac{1}{2}.$$

$$\begin{array}{r} (10) \\ 16 \times 11 \quad 16 \\ \hline 253 \quad 23 \end{array}$$

$$\begin{array}{r} (11) \\ 891 \times 100 \\ \hline 9 \end{array} = 99 \times 100 = 9900$$

$$\begin{array}{r} (12) \\ \$61.50 \times 21 \\ \hline 9 \end{array} = \$20.50 \times 7 = \$143.50$$

$$\begin{array}{r} (13) \\ £16 \text{ 4s. } 11\frac{1}{2}\text{d.} \times 147 \\ \hline 11 \end{array} = £1 \text{ 9s. } 6\frac{1}{2}\text{d.} \times 147 = £217 \text{ 2s. } 7\frac{1}{2}\text{d.}$$

$$\begin{array}{r} (14) \\ \$66.87 \times 20 \\ \hline 3 \end{array} = \$22.29 \times 20 = \$445.80$$

$$\begin{array}{r} (15) \\ 16 \times 17 \quad 272 \\ \hline 9 \quad 9 \end{array} = 30\frac{2}{3} \text{ days.}$$

$$\begin{array}{r} (16) \\ 11 \times 47 \quad 517 \\ \hline 21 \quad 21 \end{array} = 24\frac{1}{3} \text{ weeks.}$$

Exercises 57, 58.]

KEY.

147

$$\frac{\text{£}6 \text{ 7s. 4d.} \times 29}{17} = \frac{\text{£}184 \text{ 12s. 8d.}}{17} = \text{£}10 \text{ 17s. 2}\frac{1}{2}\text{d.}$$

$$\frac{\$7496.40 \times 1}{211} = \frac{\$7496.40}{211} = \$35.527$$

$$\frac{\$421.40 \times 3}{62} = \frac{\$1264.20}{62} = \$20.3903$$

$$\frac{\$56.70 \times 23}{7} = \frac{\$13.10 \times 23}{7} = \$186.30$$

Simple Proportion
EXERCISE 58.

$$28 : 42 :: 27 : \text{Ans.} = \frac{42 \times 27}{28} = \frac{81}{2} = 40\frac{1}{2} \text{ acres.}$$

$$13 : 65 :: \$1.30 : \text{Ans.} = \frac{\$1.30 \times 65}{13} = \$6.50$$

$$125 : 145 :: 100 : \text{Ans.} = \frac{145 \times 100}{125} = 29 \times 4 = 116 \text{ men.}$$

(4)

$$6 : 10 :: 100 : \text{Ans.} = \frac{10 \times 100}{6} = \frac{1000}{6} = 166\frac{2}{3} \text{ days.}$$

(5)

$$13\frac{1}{2} : 4\frac{3}{16} :: \$12.90 : \text{Ans.} = \$12.90 \times 4\frac{3}{16} \div 13\frac{1}{2}$$

$$= \$12.90 \times \frac{67}{16} \times \frac{3}{40} = \frac{\$12.90 \times 67 \times 3}{16 \times 40} = \$4.0514$$

(6)

$$80 : 100 :: \$7149 : \text{Ans.} = \frac{\$7149 \times 100}{80}$$

$$= 21490 = \$8936.25$$

(7)

$$1000 : 16.714 :: \$18.70 : \text{Ans.} = \frac{\$18.70 \times 16714}{1000}$$

$$= \frac{\$312551.80}{1000} = \$312.5518$$

(8)

$$\$1 : \$7149.70 :: 1\frac{1}{2} : \text{Ans.} = \frac{1\frac{1}{2} \times 7149.70}{1}$$

$$= 1\frac{1}{2} \times 7149.70 = 12511.975 \text{ cts.} = \$125.11975$$

(9)

$$\frac{3}{4} : 1 :: \$7194.60 : \text{Ans.} = \frac{\$7194.60 \times 1}{\frac{3}{4}}$$

$$= \$7194.60 \times \frac{4}{3} = \$16787.40$$

(10)

$$871 : 127 :: \$8671.40 : \text{Ans.} = \frac{\$8671.40 \times 127}{871}$$

$$= \$1264.3717$$

Exercise 58.]

KEY.

149

(11)

66½ days.

2½ ÷ 13½

\$4.0514

10Q

16714

0

49.70

11975

0 × 1

40 × 127

371

$$702 : 540 :: £48 \text{ 2s. } 4\frac{1}{2}\text{d.} ; \text{Ans.} = \frac{£48 \text{ 2s. } 4\frac{1}{2}\text{d.} \times 540}{702}$$

$$= \frac{£48 \text{ 2s. } 4\frac{1}{2}\text{d.} \times 10}{13} = \frac{£481 \text{ 3s. } 9\text{d.}}{13} = £37 \text{ 0s. } 3\frac{1}{3}\text{d.}$$

(12)

$$20 : 35 :: 6 : \text{Ans.} = \frac{35 \times 6}{20} = \frac{7 \times 3}{2} = \frac{21}{2} = 10\frac{1}{2} \text{ mths.}$$

(13)

$$£1 : £1749 \text{ 16s } 8\frac{1}{2}\text{d.} :: 3\text{s } 4\text{d} : \text{Ans.}$$

$$= \frac{£1749 \text{ 16s } 8\frac{1}{2}\text{d.} \times 40}{240} = \frac{£1749 \text{ 16s } 8\frac{1}{2}\text{d.}}{6} = £291 \text{ 12s. } 9\frac{1}{2}\text{d.}$$

(14)

$$24 \text{ a. } 1\text{r. } 17 \text{ per.} : 7 \text{ a. } 1 \text{ per. } 9 \text{ yds.} :: \$763.80 : \text{Ans.}$$

$$\text{or } 471537 \text{ qr. yds.} : 135677 \text{ qr. yds.} :: \$763.80 : \text{Ans.}$$

$$= \frac{\$763.80 \times 135677}{471537} = \frac{\$103680092.60}{471537} = \$219.77$$

(15)

$$100 : 63 :: \$3.75 : \text{Ans.} = \frac{\$3.75 \times 63}{100} = \$$$

K

(16)

$$7 : 276 :: \$7.90 : \text{Ans.} = \frac{\$7.90 \times 276}{7} = \$311.484$$

(17)

$$\$71911.40 : \$1 :: \$53069.80 : \text{Ans.}$$

$$= \frac{\$53069.80 \times 1}{71911.40} = \$0.7379$$

(18)

$$17 \text{ a. 1r. 36 per} : 247 \text{ a. 1r. 27 per} :: £111 \text{ 17s. 8d.} : \text{Ans.}$$

$$\text{or } 2796 \text{ per} : 39587 \text{ per} :: £111 \text{ 17s. 8d.} : \text{Ans.}$$

$$\begin{aligned} &£111 \text{ 17s. 8d.} \times 39587 \quad £4429125 \text{ 10s. 4d.} \\ &= \frac{\quad}{2796} = \frac{\quad}{2796} \\ &= £1584 \text{ ls. } 10\frac{2}{3}\text{s. 4d.} \end{aligned}$$

(19)

$$16 : 27 :: \$97.80 : \text{Ans.} = \frac{\$97.80 \times 27}{16} = \frac{\$24.45 \times 27}{4}$$

$$= \$165.0375$$

(20)

$$8 : 291 :: 7 : \text{Ans.} = \frac{291 \times 7}{8} = 254\frac{1}{2}$$

(21)

$$3 \text{ cwt. 2 qrs. 26 lbs.} : 71 \text{ cwt. 1 qr. 17 lbs.} :: \$21.60$$

$$: \text{Ans. or 418 lbs.} : 7997 \text{ lbs.} :: \$21.60 : \text{Ans.}$$

$$\begin{aligned} &\$21.60 \times 7997 \quad \$172735.20 \\ &= \frac{\quad}{418} = \frac{\quad}{418} = \$413.2421 \end{aligned}$$

Exercise 58.]

KEY.

151

(22)

$$\begin{aligned} 3\frac{1}{2} : 7\frac{1}{2} :: \$2.21 : \text{Ans.} &= \$2.21 \times 7\frac{1}{2} \div 3\frac{1}{2} \\ &= \$2.21 \times \frac{3\frac{1}{2}}{7\frac{1}{2}} \times \frac{16}{16} \\ &= \frac{\$2.21 \times 38 \times 4}{5 \times 15} = \frac{\$335.92}{75} = \$4.4789 \end{aligned}$$

(23)

$$8000 : 15000 :: 5 : \text{Ans.} = \frac{5 \times 15000}{8000} = \frac{75}{8} = 9\frac{3}{8} \text{ wks.}$$

(24)

$$5 : 129 :: 7 : \text{Ans.} = \frac{129 \times 7}{5} = \frac{903}{5} = 180 \text{ ft. } 7\frac{1}{2} \text{ in.}$$

(25)

$$\begin{aligned} 4 : 27 :: 149 : \text{Ans.} &= \frac{149 \times 27}{4} = \frac{4023}{4} \\ &= 1005 \text{ miles } 6 \text{ fur.} \end{aligned}$$

(26)

$$5 : 729 :: 4 : \text{Ans.} = \frac{729 \times 4}{5} = 583\frac{1}{5} \text{ yds.}$$

(27)

$$6 : 29 :: 11 : \text{Ans.} = \frac{29 \times 11}{6} = \frac{319}{6} = 53\frac{1}{6}$$

(28)

$$\begin{aligned} 1 \text{ lb.} : 174 \text{ lbs.} :: 29 : \text{Ans.} &= \frac{174 \times 29}{1} \\ &= 5046 \text{ cents} = \$50.46 \end{aligned}$$

(29)

 $\$4.75 : \$3.60 :: 243 \text{ acres} : \text{Ans.}$

$$\frac{243 \times 360}{475} = \frac{87480 \text{ a.}}{475} = 184 \text{ a. Or. } 26\frac{1}{5} \text{ per.}$$

(30)

 $4\frac{3}{4} : 27\frac{1}{2} :: £\frac{1}{4} : \text{Ans.} = £\frac{1}{4} \times 27\frac{1}{2} \div 4\frac{3}{4}$

$$= £\frac{1}{4} \times \frac{1}{2} \times \frac{1}{4} = \frac{£19 \times 139}{3 \times 5 \times 31} = \frac{£2641}{465} = £5 \text{ } 13\text{s. } 7\frac{1}{3}\text{d.}$$

$$= \frac{£19 \times 139}{3 \times 5 \times 31} = \frac{£2641}{465}$$

$$= \frac{£2641}{465}$$

(31)

 $\$67\frac{1}{11} : \$23\frac{2}{13} :: 6\frac{1}{2} \text{ a.} : \text{Ans.} = 6\frac{1}{2} \times 23\frac{2}{13} \div 67\frac{1}{11}$

$$= \frac{25}{4} \times \frac{308}{13} \times \frac{11}{741} = \frac{21175 \text{ a.}}{9633} = 2 \text{ a. Or. } 31\frac{817}{9633} \text{ per.}$$

(32)

 $4.32 : 9.78 :: \$1.17 : \text{Ans.}$

$$\frac{\$1.17 \times 9.78}{4.32} = \frac{\$11.4426}{4.32} = \$2.648$$

(33)

 $19.87 : 9\frac{3}{4} :: \$17\frac{1}{2} : \text{Ans.} = \$17\frac{1}{2} \times 9\frac{3}{4} \div 19.87$

$$= \frac{157}{2} \times \frac{39}{4} \div \frac{1987}{100}$$

$$= \frac{\$157}{9} \times \frac{66}{7} \times \frac{100}{1987} = \frac{\$1036200}{125181} = \$8.2776$$

(34)

 $11 : 27 :: 29 \text{ lbs.} : \text{Ans.}$

$$\frac{29 \text{ lbs.} \times 27}{11} = \frac{783}{11} = 71\frac{2}{11} \text{ lbs.}$$

(35)

$$200 : 900 :: 2 \text{ days} : \text{Ans.} = \frac{900 \times 2}{200} = \frac{18}{2} = 9 \text{ dys.}$$

(36)

$$\begin{aligned} \$95\frac{7}{11} : \$100 :: \$100 \text{ stock} : \text{Ans.} &= \frac{\$100 \times 100}{95\frac{7}{11}} \\ &= \$100 \times 100 \times \frac{11}{1057} = \frac{110000}{1057} = \$104.5627. \end{aligned}$$

(37)

$$\begin{aligned} 11\text{oz. 11dwt. 11grs.} : 16\text{lbs. 4 oz. 2 dwt.} :: \$47.90 : \text{Ans.} \\ \text{or } 5555 \text{ grs.} : 94128 \text{ grs.} :: \$47.90 : \text{Ans.} \\ \$47.90 \times 94128 &= \$4508731.20 \\ = \frac{4508731.20}{5555} &= \$811.652. \end{aligned}$$

(38)

$$\begin{aligned} 73 \text{ a. 14 per.} : 33 \text{ a. 1 r. 23 per.} :: £17 \text{ 4s. 9d.} : \text{Ans.} \\ \text{or } 11694 \text{ per.} : 5343 :: £17 \text{ 4s 9d} : \text{Ans.} \\ £17 \text{ 4s 9d} \times 5343 &= £92099 \text{ 19s 3d} \\ = \frac{92099 \text{ 19s 3d}}{11694} &= £7 \text{ 17s } 6\frac{7}{11}\text{d.} \end{aligned}$$

(39)

$$\begin{aligned} \frac{1}{2} \text{ of } \frac{3}{4} \text{ of } \frac{5}{6} \text{ of } 17\frac{1}{2} \text{ lbs.} &= \frac{1}{2} \times \frac{3}{4} \times \frac{5}{6} \times \frac{35}{2} = 3 \text{ lbs.} \\ &= \frac{\$0.50}{1} \times \frac{2}{7} \times \frac{3}{11} \\ &= \frac{\$3.50}{11} = \$0.31818 \end{aligned}$$

(Continued on next page.)

(39 continued.)

$$\frac{\$0.50 \times 2 \times 3}{1} = \$3.$$

$$6\frac{1}{2} \text{ of } \frac{1}{2} \text{ of } \frac{2}{3} \text{ of } 8\frac{1}{2} \text{ lbs.} = \frac{27}{4} \times \frac{1}{2} \times \frac{2}{3} \times \frac{17}{2} = 4\frac{1}{2} \text{ lbs.}$$

$$3 : 4\frac{1}{2} :: \$3.00 : \text{Ans.} = \$3.00 \times 4\frac{1}{2} \div 3$$

$$\begin{aligned} & \$1.00 \\ & \$3.00 \quad 51 \quad 1 \quad \$51.00 \\ & = \frac{1}{1} \times \frac{51}{28} \times \frac{1}{8} = \frac{51.00}{28} = \$1.8214. \end{aligned}$$

(40)

$$29 : 107 :: 11 : \text{Ans.} = \frac{107 \times 11}{29} = \frac{1177}{29} = 40\frac{17}{29}$$

EXERCISE 59.

(1)

$$\begin{array}{l|l} 24 : 17 & \\ 12 : 22 & \end{array} :: 7 : \text{Ans.} = \frac{7 \times 17 \times 22}{24 \times 12} = \frac{1309}{144} = 9\frac{13}{144} \text{ ac.}$$

(2)

$$\begin{array}{l|l} 11 : 7 & \\ 7 : 16 & \end{array} :: \$490 : \text{Ans.} = \frac{\$490 \times 7 \times 16}{7 \times 11} = \$712.72\frac{2}{11}$$

(3)

$$\begin{array}{l|l} 5000 : 4000 & \\ 15 : 11 & \end{array} \quad \begin{array}{l} \text{:: 110 reams : Ans.} = \frac{110 \times 4000 \times 11}{5000 \times 15} \\ = \frac{484}{15} = 64\frac{4}{15}. \end{array}$$

= $6\frac{1}{3}$ lbs.

(4)

$$\begin{array}{l|l} 7 : 21 & \\ 93 \text{ a.} : 16 \text{ a. 3 r. 20 per.} & \end{array} \quad \begin{array}{l} \text{:: 5 : Ans.} = \frac{5 \times 21 \times 2700}{7 \times 14880} \\ = \frac{270}{148} = 2\frac{1}{148} \text{ days.} \end{array}$$

14.

(5)

$$\begin{array}{l|l} 24 : 50 & \\ 8 : 11 & \end{array} \quad \begin{array}{l} \text{:: 7 days : Ans.} = \frac{7 \times 50 \times 11}{24 \times 8} = \frac{385}{16} \\ = 20\frac{5}{16} \text{ days.} \end{array}$$

= 40 $\frac{1}{2}$.

(6)

$$\begin{array}{l|l} 750 : 467 & \\ 23 : 7 & \end{array} \quad \begin{array}{l} \text{:: \$204 : Ans.} = \frac{\$204 \times 467 \times 7}{750 \times 23} \\ = \$38.65\frac{1}{11}. \end{array}$$

= $9\frac{1}{4}$ ac.

(7)

$$\begin{array}{l|l} 17 : 34 & \\ 11 : 33 & \\ 5 : 4 & \\ 3 : 2 & \end{array} \quad \begin{array}{l} \text{:: 79 : Ans.} = \frac{79 \times 34 \times 33 \times 4 \times 2}{17 \times 11 \times 5 \times 3} \\ = \frac{79 \times 2 \times 2 \times 4}{5} = \frac{1264}{5} = 252\frac{4}{5} \text{ ft.} \end{array}$$

712.72 $\frac{1}{11}$.

(8)

$$\begin{array}{l|l}
 34 \text{ a.} : 95 \text{ a. } 32 \text{ per.} & :: 3 : \text{Ans.} = \frac{3 \times 15232 \times 5}{5440 \times 8} \\
 6 : 5 & \frac{1088}{2}
 \end{array}$$

$$= \frac{15232}{176} = 7 \text{ men.}$$

(9)

$$\begin{array}{l|l}
 36 : 864 & \\
 8 : 6 & \\
 4 : 3 & :: 4 : \text{Ans.} = \frac{4 \times 864 \times 8 \times 3 \times 32}{36 \times 8 \times 4 \times 48} \\
 48 : 32 & \frac{8}{8}
 \end{array}$$

$$= 4 \times 3 \times 3 = 36 \text{ days}$$

(10)

$$\begin{array}{l|l}
 34 : 8 & \\
 6 : 36 & :: 90 : \text{Ans.} = \frac{10 \times 8 \times 36 \times 12}{34 \times 6 \times 9} \\
 9 : 12 & \frac{17}{17}
 \end{array}$$

$$= \frac{3840}{17} = 169\frac{7}{17} \text{ cords.}$$

(11)

$$\begin{array}{l|l}
 9 : 5 & \\
 10 : 11 & \\
 25 : 36 & :: 16 : \text{Ans.} = \frac{8 \times 12 \times 2 \times 5 \times 9}{9 \times 10 \times 25 \times 24 \times 44 \times 40} \\
 24 : 16 & \frac{5 \quad 8 \quad 4 \quad 8}{2} \\
 44 : 50 & \\
 40 : 45 &
 \end{array}$$

$$= 12 \text{ days.}$$

(12)

$$\begin{array}{l} 24 : 248 \\ 9 : 11 \\ 7 : 4 \\ 232\frac{1}{2} : 337\frac{1}{2} \\ 8\frac{1}{2} : 5\frac{1}{2} \\ 2\frac{1}{2} : 3\frac{1}{2} \end{array} \quad \therefore 5\frac{1}{2} \text{ days.} : \text{Ans.} = \frac{5\frac{1}{2} \times 248 \times 11}{\times 4 \times 337\frac{1}{2} \times 5\frac{1}{2} \times 3\frac{1}{2}} \\ \frac{24 \times 9 \times 7 \times 232\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2}}{=}$$

$$\frac{11}{2} \times \frac{248}{1} \times \frac{11}{1} \times \frac{4}{1} \times \frac{675}{2} \times \frac{28}{1} \times \frac{7}{2} \div$$

$$\left(\frac{24}{1} \times \frac{9}{1} \times \frac{7}{1} \times \frac{465}{2} \times \frac{11}{3} \times \frac{7}{1} \right) =$$

$$\frac{11}{2} \times \frac{248}{1} \times \frac{11}{1} \times \frac{4}{1} \times \frac{185}{2} \times \frac{28}{5} \times \frac{7}{2} \times \frac{1}{24} \times \frac{1}{9} \times \frac{1}{7} \times \frac{2}{465}$$

$$\times \frac{3}{11} \times \frac{8}{7} = 11 \times 4 \times 3 = 132 \text{ days.}$$

(13)

$$\begin{array}{l} 500 : 550 \\ 36 : 68 \\ 40 : 90 \\ 44 : 24 \\ 9 : 8 \end{array} \quad \therefore 60 : \text{Ans.} = \frac{11 \times 5 \times 17 \times 10}{550 \times 60 \times 68 \times 90 \times 9} \\ \frac{500 \times 36 \times 40 \times 44 \times 9}{10 \times 8 \times 4 \times 4} \div$$

$$\times \frac{8}{24} \times \frac{2}{8} = 17 \times 8 = 136 \text{ men.}$$

(14)

9 lbs. 6 oz. 4 dwt. : 11 lbs. 11 oz. 17 grs. :: 60 : Ans.
7s. 8½d. : 11s. 4½d.

$$\begin{array}{r} 3 \\ 12 \quad 91 \\ 60 \times 68657 \times 273 \quad 3 \times 68657 \times 91 \quad 18743361 \\ \hline 54816 \times 185 \quad 4568 \times 37 \quad 169016 \\ 18272 \\ 4568 \quad 37 \\ \hline = 110151601 \text{ forks.} \\ 189016 \end{array}$$

NOTE.—9 lbs., 6 oz., 4 dwt., = 54818 grs.; 11 lbs., 11 oz., 17 grs. = 68657 grs. 7s. 8½d. = 185 half-pence; and 11s. 4½d. = 273 half-pence.

(15)

$$\begin{array}{r} 9 \quad 10 \\ 279 \times 27 \times 200 \\ 60 : 200 \quad | \quad :: 279 : \text{Ans.} = \frac{60 \times 4}{8} \\ 25110 \\ = \frac{25110}{4} = 6277\frac{1}{2} \text{ bush.} \end{array}$$

(16)

$$\begin{array}{r|l} 23 : 48 & \\ 27.9 : 16.5 & : : 7.3 \text{ ac's : Ans.} = \frac{16 \times 5.5 \times 7.3 \times 48 \times 16.5 \times 9.4}{23 \times 27.9 \times 11.4} \\ 11.4 : 9.4 & \end{array}$$

$$\frac{6038.56}{812.82} = 7\frac{114}{1064} \text{ acres.}$$

: 60: Ans.

18743361

169016

oz., 17 grs.
4d. = 273

10
x 200

5.5
8.5 x 9.4
x 11.4
3.8

(17)

$$\begin{array}{l} 11 : 16 \\ 11 : 16 \end{array} \left| \begin{array}{l} : : \$111.11 : \text{Ans.} = \frac{\$111.11 \times 16 \times 16}{11 \times 11} \\ \\ = \frac{\$28444.16}{121} = \$235.07 \frac{60}{100} \end{array} \right.$$

(18)

$$\begin{array}{l} 8 : 6 \\ 4 : 6 \\ 2 : 4 \end{array} \left| \begin{array}{l} : : 8550 : \text{Ans.} = \frac{8550 \times 8 \times 8 \times 4}{8 \times 4 \times 2} \\ \\ = \frac{76950}{4} = 19237 \frac{1}{2} \text{ lbs.} \end{array} \right.$$

(19)

$$\begin{array}{l} 8 : 10 \\ 8 : 8 \\ 2 \frac{1}{2} : 2 \end{array} \left| \begin{array}{l} : : 10000 : \text{Ans.} = \frac{10000 \times 10 \times 8 \times 2}{8 \times 8 \times 2 \frac{1}{2}} \\ \\ = 10000 \text{ lbs.} \end{array} \right.$$

(20)

$$\begin{array}{l} 2 \frac{1}{2} : 17 \frac{3}{4} \\ 1 \frac{3}{4} : 1 \frac{3}{4} \end{array} \left| \begin{array}{l} : : 14 \text{ oz.} : \text{Ans.} = \frac{14 \times 17 \frac{3}{4} \times 1 \frac{3}{4}}{1 \frac{3}{4} \times 2 \frac{1}{2}} \\ \\ = \frac{14}{1} \times \frac{88}{5} \times \frac{10}{7} \div \left(\frac{5}{3} \times \frac{9}{4} \right) \\ \\ = \frac{14}{1} \times \frac{88}{5} \times \frac{10}{7} \times \frac{4}{9} \times \frac{3}{5} = \frac{1408}{15} = 93 \frac{1}{3} \text{ oz.} \end{array} \right.$$

(21)

$$\begin{aligned}
 2\frac{1}{2} : 1\frac{1}{2} & \quad | \quad :: 2043\frac{1}{2} \text{ yds.} : \text{Ans.} = \frac{2043\frac{1}{2} \times 1\frac{1}{2} \times 981}{2\frac{1}{2} \times 847} \\
 847 : 981 & \quad | \\
 & = \frac{14304}{7} \times \frac{8}{5} \times \frac{981}{1} \div \left(\frac{7}{3} \times \frac{847}{1} \right) \\
 & = \frac{14304}{7} \times \frac{8}{5} = \frac{981}{1} \times \frac{3}{7} \times \frac{1}{847} = \frac{336773376}{207515} \\
 & = 1622\frac{184918}{1037575} \text{ yds.}
 \end{aligned}$$

(22)

$$\begin{aligned}
 8 : 14 & \quad | \quad :: 97 : \text{Ans.} = \frac{97 \times 14 \times 3\frac{1}{2} \times 9\frac{1}{2}}{8 \times 4 \times 7\frac{1}{2}} \\
 4 : 3\frac{1}{2} & \quad | \\
 7\frac{1}{2} : 9\frac{1}{2} & \quad | \\
 & = \frac{97}{7} \times \frac{14}{1} \times \frac{7}{2} \times \frac{47}{8} \div \left(\frac{4}{1} \times \frac{1}{4} \times \frac{23}{2} \right) \\
 & = \frac{97}{1} \times \frac{14}{1} \times \frac{7}{2} \times \frac{47}{5} \times \frac{1}{8} \times \frac{1}{4} \times \frac{3}{23} = \frac{670173}{3680} \\
 & = 182\frac{413}{3680} \text{ acres.}
 \end{aligned}$$

(23)

$$\begin{aligned}
 4 : 12 & \quad | \quad :: 450 : \text{Ans.} = \frac{450 \times 12 \times 97}{4 \times \frac{24}{2}} = \frac{\$43650}{8} \\
 24 : 97 & \quad | \\
 & = \$5456.25
 \end{aligned}$$

(24)

$$\begin{aligned}
 24 : 29 & \quad | \quad :: 54 : \text{Ans.} = \frac{54 \times 29 \times 27}{24 \times 3} = \frac{783}{4} \\
 9 : 27 & \quad | \\
 & = 195\frac{3}{4} \text{ bush.}
 \end{aligned}$$

$\times 1\frac{1}{2} \times 981$ *Practice*

EXERCISE 60.

(1)

50 c.	$\frac{1}{2}$	229 at \$2.75
		2
		<hr/>
		458
25 c.	$\frac{1}{2}$	114.50
		57.25
		<hr/>
		\$629.75

(2)

50 c.	$\frac{1}{2}$	743 at \$3.81
		3
		<hr/>
		2229
25 c.	$\frac{1}{2}$	371.50
5 c.	$\frac{1}{2}$	185.75
1 c.	$\frac{1}{2}$	37.15
		7.43
		<hr/>
		\$2830.83

(3)

50 c.	$\frac{1}{2}$	7114 at \$07.30 $\frac{1}{2}$
		97
		<hr/>
		49798
		64026
		<hr/>
		690058
		3557
25 c.	$\frac{1}{2}$	1778.50
10 c.	$\frac{2}{5}$	711.40
1 $\frac{1}{2}$ c.	$\frac{1}{2}$	88.925
$\frac{1}{2}$ c.	$\frac{1}{2}$	17.785
		<hr/>
		\$696211.61

(4)

10s.	$\frac{1}{2}$	213 at £2 16s 4d
		2
		<hr/>
		426
		106 10
5s.	$\frac{1}{2}$	53 5
1s 3d	$\frac{1}{2}$	13 6 3
1d.	$\frac{1}{16}$	17 9
		<hr/>
		599 19 0

(5)

1s.	$\frac{1}{20}$	321 at £9 1s. 1½d.
		9
		<hr/>
		2889
1d.	$\frac{1}{12}$	16 1
$\frac{1}{4}$	$\frac{1}{4}$	1 6 9
		6 8½
		<hr/>
		£2906 14 5½

(6)

10s.	$\frac{1}{2}$	7147 at £12 12 2½
		12
		<hr/>
		85764
2s.	$\frac{1}{5}$	3573 10
2d.	$\frac{1}{12}$	714 14
$\frac{1}{2}$	$\frac{1}{2}$	59 11 2
$\frac{1}{4}$	$\frac{1}{4}$	14 17 9½
		7 8 10½
		<hr/>
		£90134 1 10½

(7)

50 c.	$\frac{1}{2}$	217½ at 914·70
20 c.	$\frac{1}{5}$	914 3
		<hr/>
		868 4)2744·10
		217
		<hr/>
		1953 686·025
		<hr/>
		198338
		108·50
		43·40
		686·025
		<hr/>
		\$199175·925

Exercise 60.]

KEY.

163

(8)

50 c.	$\frac{1}{2}$	618 $\frac{1}{2}$	at \$42.71 $\frac{1}{2}$
20 c.	$\frac{1}{4}$	42	4
		<hr/>	<hr/>
		1236	9)170.87
		2472	<hr/>
		<hr/>	18.98 $\frac{3}{4}$
		25956	
		309	
1	$\frac{1}{10}$	123.60	
$\frac{1}{2}$	$\frac{1}{2}$	6.18	
$\frac{1}{4}$	$\frac{1}{4}$	3.09	
		1.54 $\frac{1}{2}$	
		18.98 $\frac{3}{4}$	
		<hr/>	
		\$26418.40 $\frac{1}{16}$	

(9)

50 c.	$\frac{1}{2}$	907 $\frac{1}{2}$	at \$16.93
		16	11
		<hr/>	<hr/>
		5442	12)186.23
		907	<hr/>
		<hr/>	15.51 $\frac{1}{2}$
		14512	
25	$\frac{1}{4}$	453.50	
12 $\frac{1}{2}$	$\frac{1}{2}$	226.75	
5	$\frac{3}{8}$	113.37 $\frac{1}{2}$	
$\frac{1}{2}$	$\frac{1}{10}$	45.35	
		4.53 $\frac{1}{2}$	
		15.51 $\frac{1}{2}$	
		<hr/>	
		\$15371.02 $\frac{1}{16}$	

(10)

5	1	204½ at £2 7 8½
		2
		<hr/>
		408
2s 6d	1	51
2d	16	25 10 2)2 7 8½
1d	1	1 14
		<hr/>
		8 6 1 3 10½
		1 3 10½
		<hr/>
		£487 16 4½

(11)

10	1	604½ at £93 13 7
		93
		<hr/>
		1812 7)281 0 9
		5436
		<hr/>
		40 2 11½
		56172
3 4	1	302
2	16	100 13 4
1	1	5 0 8
		2 10 4
		40 2 11½
		<hr/>
		£56622 7 3½

NOTE
by mere
tice in t

Exercise 60.]

KEY.

165

(12)

4s.	1	904 ³⁷ ₁₉	at £16 4 9 ¹ ₂
		16	37
		5424	49)600 18 0 ¹ ₂
		904	
		14464	12 5 3 ³⁹ ₁₉₆
8	1	180 16	
1	1	30 2 8	
1	1	3 15 4	
1	1	1 17 8	
		18 10	
		12 5 3 ³⁹ ₁₉₆	
		£14693 15 9 ³⁹ ₁₉₆	

(13)

4 oz.	1	617 lbs. 4 oz. at \$91.43
		\$91.43
		64001
		22.85 ¹ ₂
		9143
		54858
		56412.31
		22.85 ¹ ₂
		\$56435.16 ¹ ₂

NOTE.—Most of these questions are more expeditiously worked by mere multiplication; but in order to afford sufficient practice in the rule it is advisable to work as above.

(14)

2171 a. 2 r. 17 per. at \$9.70 per acre.

2 r.	$\frac{1}{2}$	9.70
		2171
		<hr/>
		970
		6790
		970
		1940
		<hr/>
10 per.	$\frac{1}{10}$	21058.70
5	$\frac{1}{5}$	4.85
2	$\frac{1}{2}$	.60 $\frac{1}{2}$
		.30 $\frac{1}{16}$
		.12 $\frac{1}{4}$
		<hr/>
		\$21064.58 $\frac{1}{16}$

(15)

114 bush. 1 pk. 1 gal. 1 qt. at 37 $\frac{1}{2}$ cents per bush.

1 pk.	$\frac{1}{2}$	37 $\frac{1}{2}$
		114
		<hr/>
		42.75
1 gal.	$\frac{1}{4}$	.09 $\frac{3}{4}$
1 qt.	$\frac{1}{4}$	.04 $\frac{1}{8}$
		.01 $\frac{1}{16}$
		<hr/>
		42.90 $\frac{1}{8}$

(16)

209 lbs. 7 dwt. 16 grs. at \$1.71 per oz.

12

2508 oz.

£ dwt.	1	\$1.71
		2508
		<hr/>
		4288.68
2 dwt. 12 grs.	1	.421
4 grs.	16	.211
		.01 ⁵¹ ₁₆₀
		<hr/>
		\$4289.33 ¹¹ ₁₆

(17)

614 yds. 2 qrs. 1 nail at \$2.73 per yd.

2 qrs.	1	2.73
		614
		<hr/>
1 na.	1	1676.22
		1.361
		.17 ¹ ₁₆
		<hr/>
		\$1677.75 ² ₁₆

(18)

16 a. 1 r. 4 per. 7 yds. at £2 17s 6d per acre.

12	1	£2 17 6
		16
		<hr/>
4 per.	16	46 0 0
7 yds.	171	14 41
		1 51
		<hr/>
		£46 15 10 ¹¹ ₁₆

(19)

29 wks. 4 days 11 hours at \$7.40 per week.

3½ days	½	\$7.40
		<u>29</u>
½ day	½	214.60
6 hrs.	½	3.70
3 hrs.	½	.529
1½ hrs.	½	.264
½ hr.	½	.131½
		.0617
		.0217
		<u>\$219.311½</u>

(20)

167 miles 7 fur. 6 per. at £9 3s 6d per mile.

4 fur.	½	£9 3s 6d
		<u>167</u>
2 fur.	½	£1532 4 6
1 fur.	½	4 11 9
5 per.	½	2 5 10½
1 per.	½	1 2 11½
		2 10½
		<u>£1540 8 6¾</u>

(21)

217 lbs. 4 oz. 6 drs. 2 scr. at £9 6s 1 per oz.
12

2608 oz.

(Continued on next page.)

Exercise 60.]

KEY.

169

(21) continued.

4 drs.	$\frac{1}{2}$	£9 6s 7d
		2608
2 drs.	$\frac{1}{2}$	24330 9 4
1 $\frac{1}{2}$ scr.	$\frac{1}{2}$	4 13 3 $\frac{1}{2}$
$\frac{1}{2}$ scr.	$\frac{1}{2}$	2 6 7 $\frac{1}{2}$
		11 7 $\frac{1}{2}$
		3 10 $\frac{1}{2}$
		£24338 4 9 $\frac{1}{2}$

(22)

2s. 6d.	$\frac{1}{2}$	9167 at £1 3s. 6d. each.
1	$\frac{1}{20}$	1145 17 6
		458 7
		£10771 4 6

(23)

40 c.		21791 at \$1.40 each.
		716.40
		\$30507.40

(24)

2s.	$\frac{1}{10}$	1673 $\frac{3}{4}$ sq. yds. at 2s. 3 $\frac{1}{2}$ d per sq. yard.
		3
3d.	$\frac{1}{8}$	167 6
		20 18 3
$\frac{1}{4}$ d.	$\frac{1}{6}$	3 9 8 $\frac{1}{2}$
		7 $\frac{1}{2}$
		£191 14 7

(25)

437 a. 9 per. 7 yds. at \$21.40 per acre.

8 per.	$\frac{1}{10}$	\$21.40
		437
		<hr/>
		\$9351.80
1 per.	$\frac{1}{100}$	1.07
7 yds.	$\frac{7}{100}$	.137
		.0377
		<hr/>
		\$9353.0377

(26)

97 cub. yd. 4 ft. at \$0.73 per cub. yd.

3 ft.	$\frac{1}{10}$	\$0.73
		97
		<hr/>
		\$70.81
1 ft.	$\frac{1}{10}$	.087
		.0277
		<hr/>
		\$70.9177

(27)

20	$\frac{1}{10}$	614 $\frac{2}{9}$ cwt. at \$1.23 per cwt.
2	$\frac{1}{10}$	122.80
1	$\frac{1}{10}$	12.28
		6.14
		19)3.69
		.19 $\frac{2}{9}$
		<hr/>
		\$755.41 $\frac{2}{9}$

(28)

23 lbs. 4 oz. 7 dwt. 11 grs. at 11½d per dwt.

12

286

20

6	1	5607 dwt. 11 grs. at 11½d per dwt.			
3	1	2803 6	8 grs.	1	11½d.
2	1	1401 9			
1	1	934 6	2 grs.	1	3½
1	1	233 7½	1 gr.	1	0½
		116 9½			0½
		58½			58½

20)5490 78½

£274 10s. 78½d.

(29)

216 cwt. 2 qrs. 19 lbs. at \$96.71 per cwt.

3 qrs.	1	\$96.71
		216
		20889.36
14 lbs.	1	48.35½
		12.08½
3½ lbs.	1	3.02½
1½ lbs.	1	1.29½
		\$20954.12½

(30)

179 cwt. 1 qr. 23 lbs. at £9 14s. 11½d. per cwt.

1 qr.	¼	£9 14s. 11½d.
		179
		<hr/>
		1744 17 6 ½
14 lbs.	⅛	2 8 8 ⅞
7 lbs.	⅛	1 4 4 ⅞
		12 2 ⅞
2 lbs.	¼	3 5 ⅞
		<hr/>
		£1749 6 3 ⅞

EXERCISE 62.

(1)

$$\$6090.80 \times .27 = \$1644.516$$

(2)

$$\$1234 \times .875 = \$1079.750$$

(3)

$$\$89.40 \times .0625 = \$5.5875$$

(4)

$$\$2998.40 \times .175 = \$524.72$$

(5)

$$204a. 2r. 14 per. = 204.5875a.; 204.5875a. \times .085 \\ = 17.3899375 \text{ acres}$$

$$17.3899375 \text{ acres} = 17 \text{ acres, 1 rood, 22 p. 11 yds.} \\ 7 \text{ ft. } 25\frac{1}{4} \text{ in.}$$

(6)

$$29 \text{ bush. 2 pks.} = 29.5 \text{ bush.}; 29.5 \text{ bush.} \times .007 \\ = .2065 \text{ bush.}$$

$$.2065 \text{ bush.} = 1 \text{ gal. 2 qts. } 1.216 \text{ pts.} \\ = 1 \text{ gal. 2 qt. } 1\frac{27}{32} \text{ pts.}$$

(7)

$$429 \text{ lbs. } 11 \text{ oz. } \odot \text{ dwt.} = 429 \cdot 9416 \text{ lbs.}; 429 \cdot 9416 \times \cdot 0072 \\ = 3 \cdot 09558 \text{ lbs.}$$

$$3 \cdot 09558 \text{ lbs.} = 3 \text{ lbs. } 1 \text{ oz. } 2 \text{ dwt. } 22\frac{311}{311} \text{ grs.}$$

(8)

$$227 \text{ wks. } 4 \text{ dys. } 11 \text{ hrs.} = 227 \cdot 6369 + \text{weeks} \\ 227 \cdot 6369 \text{ weeks} \times \cdot 15 \\ = 34 \cdot 145535 \text{ wks.} = 34 \text{ wks. } 1 \text{ day } 26 \cdot 99 + \text{minutes.}$$

(9)

$$\text{£}93 \text{ } 14\text{s. } 7\frac{1}{2}\text{d.} = \text{£}93 \cdot 73125; \\ \text{£}93 \cdot 73125 \times \cdot 06 = \text{£}5 \cdot 623875 = \text{£}5 \text{ } 12\text{s. } 5\frac{73}{100}\text{d.}$$

(10)

$$\$2947 \cdot 40 \times \cdot 29 = \$854 \cdot 746.$$

(11)

$$\$294 \times \cdot 16 = \$47 \cdot 04; \$39 \cdot 17 \times \cdot 29 = \$11 \cdot 3593 \\ \$47 \cdot 04 - \$11 \cdot 3593 = \$35 \cdot 6807$$

(12)

$$\$94 \cdot 80 \times \cdot 07 = \$6 \cdot 6360; \$1129 \times \cdot 11 = \$124 \cdot 19; \\ \$1296 \cdot 42 \times \cdot 175 = \$226 \cdot 8735 \\ \$6 \cdot 636 + \$124 \cdot 19 + \$226 \cdot 8735 = \$357 \cdot 6995$$

(13)

$$\$7429 \times \cdot 15 = \$1114 \cdot 35 = \text{1st payment.} \\ \$7429 \times \cdot 17 = \$1262 \cdot 93 = \text{payment at end of 6 months} \\ \$7429 \times \cdot 29 = \$2154 \cdot 41 = \quad \quad \quad 15 \quad \quad \quad \\ \$7429 \times \cdot 09 = \$668 \cdot 61 = \quad \quad \quad 20 \quad \quad \quad \\ \$7429 \times \cdot 30 = \$2228 \cdot 70 = \quad \quad \quad 24 \quad \quad \quad$$

(14)

$$227 \times \cdot 20 = 45 \cdot 4 \text{ acres wheat} \\ 227 \times \cdot 18 = 40 \cdot 86 \quad \text{" grass} \\ 227 \times \cdot 17 = 38 \cdot 59 \quad \text{" peas} \\ 227 \times \cdot 19 = 43 \cdot 13 \quad \text{" oats} \\ 227 \times \cdot 08 = 18 \cdot 16 \quad \text{" root crops} \\ 227 \times \cdot 18 = 40 \cdot 86 \quad \text{" fallow}$$

(15)

$$1147 \times .23 = 263.81 = 263\frac{81}{100} \text{ killed or wounded.}$$

$$1147 \times .07 = 80.29 = 80\frac{29}{100} \text{ taken prisoners.}$$

EXERCISE 63.

(1)

$$\$79.80 \times .045 = \$3.591.$$

(2)

$$\$916.80 \times .0775 = \$71.052.$$

(3)

$$\$10800 \times .015 = \$162.$$

(4)

$$\$8877.66 \times .0325 = \$288.52395.$$

(5)

$$\$678.90 \times .05 = \$33.94\frac{1}{2}.$$

(6)

$$\$6719.50 \times .0875 = \$587.95625.$$

(7)

$$\$47.80 \times .25 = \$11.95.$$

(8)

$$\$7654.32 \times .045 = \$344.4444.$$

(9)

$$\$234.56 \times .28 = \$65.6768.$$

(10)

$$\$555.55 \times .1875 = \$104.165625.$$

(11)

$$617 \text{ bush. at } \$1.70 = \$1048.90.$$

$$\$1048.90 \times .125 = \$131.1125.$$

(12)

$$\$1122.30 \times .33\frac{1}{4} = \$374.10.$$

(13)

$$\$8765.40 \times .0375 = \$328.7025.$$

(14)

$$\$7800 \times .07 = \$546.$$

(15)

$$\$907.80 \times .15 = \$136.17.$$

(16)

$$\$7.87\frac{1}{2} \times 7400 = \$58275.00.$$

$$\$58275.00 \times .0825 = \$4807.6875.$$

(17)

$$\$7450 \times .025 = \$186.25.$$

(18)

$$\$1140 \times .03375 = \$38.475.$$

EXERCISE 64.

(1)

$$\$789.46 \times .0275 = \$21.71015.$$

(2)

$$\$8167.50 \times .022 = \$179.685.$$

(3)

$$\$8900 \times .032 = \$284.80.$$

(4)

$$\$8740 \times .00375 = \$32.775.$$

(5)

$$\$1888 \times .004 = \$7.552.$$

(6)

$$\$11247.60 \times .0125 = \$140.595.$$

(7)

$$\$4780 \times .01375 = \$65.725.$$

(8)

$$\$27490 \times .026 = \$714.74.$$

(9)

$$\$8790 \times .02125 = \$186.7875.$$

(10)

$$\$17496.50 \times .00875 = \$153.094375.$$

EXERCISE 65.

(1)

$$\begin{aligned} \$100 \text{ stock} &= \$117.25 \text{ money or } \$1.00 \text{ stock} \\ &= \$1.1725 \text{ money} \end{aligned}$$

$$\$793 \div \$1.1725 = \$7930000 \div 11725 = \$676.3326$$

(2)

$$\begin{aligned} \$100 \text{ stock} &= \$90.50 \text{ money or } \$1 \text{ stock} = \$0.905 \text{ money} \\ &= \$0.905 \times .9476 = \$8575.78 \end{aligned}$$

(3)

$$\$125 \times 9 = \$1125$$

$$\begin{aligned} \$100 \text{ stock} &= \$108.375 \text{ money or } \$1 \text{ stock} \\ &= \$1.08375 \text{ money} \end{aligned}$$

$$\$1.08375 \times 1125 = \$1219.21875$$

(4)

$$\begin{aligned} \$111.216 \times 17 &= \$1890.672 \\ \$100 \text{ stock} &= \$103.50 \text{ money or } \$1 \text{ stock} \\ &= \$1.035 \text{ money} \\ \$1.035 \times 1890.672 &= \$1956.84552 \end{aligned}$$

(5)

$$\begin{aligned} \$100 \text{ stock} &= \$88 \text{ money or } \$1 \text{ stock} = \$0.88 \text{ money} \\ \$0.88 \times 6470 &= \$5693.60 \end{aligned}$$

(6)

$$\begin{aligned} \$100 \text{ stock} &= \$106.25 \text{ money or } \$1 \text{ stock} \\ &= \$1.0625 \text{ money} \\ \$2000 \div \$1.0625 &= \$20000000 \div \$10625 \\ &= \$1882.3529 \end{aligned}$$

(7)

$$\begin{aligned} \$100 \text{ stock} &= \$127 \text{ money or } \$1 \text{ stock} = \$1.27 \text{ money} \\ \$7000 \div \$1.27 &= \$700000 \div \$127 = \$5511.81102 \end{aligned}$$

(8)

$$\begin{aligned} \$100 \text{ stock} &= \$92 \text{ money or } \$1 \text{ stock} = \$0.92 \text{ money} \\ \$0.92 \times 6140 &= \$5648.80 \end{aligned}$$

(9)

$$\begin{aligned} \$25 \times 27 &= \$675 \\ \$100 \text{ stock} &= \$101.25 \text{ money or } \$1 \text{ stock} \\ &= \$1.0125 \text{ money} \\ \$1.0125 \times 675 &= \$683.4375 \end{aligned}$$

(10)

$$\begin{aligned} \$100 \text{ stock} &= \$113.50 \text{ money or } \$1 \text{ stock} \\ &= \$1.135 \text{ money} \\ \$11120 \div \$1.135 &= \$11120000 \div \$1135 = \$9797.3568 \end{aligned}$$

EXERCISE 66.

(1)

$$\$974 \times .11 = \$107.14$$

(2)

$$\$1678.90 \times .09 = \$151.101 \times 7 = \$1057.707$$

(3)

$$\$142.70 \times .08 = \$11.416; \$11.416 \times 16 = \$182.656$$

(4)

$$\$80.80 \times .07 = \$5.656; \$5.656 \times 22 = \$124.432$$

(5)

$$\$67.49 \times .025 = \$1.68725; \$1.68725 \times 6 = \$10.1235$$

(6)

$$\begin{aligned} \$208.60 \times .03375 &= \$7.04025; \$7.04025 \times 11 \\ &= \$77.44275 \end{aligned}$$

(7)

$$\$800 \times .08 = \$64 = \text{interest for 1 year.}$$

4 mos.	$\frac{1}{3}$	\$64		
		6		
		<hr/>		
		38 4	= interest for 6 years.	
1 mo.	$\frac{1}{3}$	21 33 $\frac{1}{3}$	"	4 mos.
10 dys	$\frac{1}{3}$	5 33 $\frac{1}{3}$	"	1 "
5 dys.	$\frac{1}{3}$	1 77 $\frac{2}{3}$	"	10 days.
2 $\frac{1}{2}$ dys	$\frac{1}{3}$	88 $\frac{2}{3}$	"	5 "
$\frac{1}{2}$ dy	$\frac{1}{3}$	44 $\frac{2}{3}$	"	2 $\frac{1}{2}$ "
		08 $\frac{2}{3}$	"	$\frac{1}{3}$ "

$$\$413\ 86\frac{2}{3} \text{ interest for 6 yrs. 5 mos. 18 dys.}$$

(8)

$$\$7400 \times .0625 = \$462.50 = \text{interest for 1 year.}$$

6 mos.	$\frac{1}{2}$	\$ 462.50
4 mos.	$\frac{1}{3}$	9

$$4162.50 = \text{interest for 9 years.}$$

1 mo.	$\frac{1}{12}$	231.25	"	6 mos.
15 dys.	$\frac{1}{8}$	154.16 $\frac{2}{3}$	"	4 "
7 $\frac{1}{2}$ dys.	$\frac{1}{4}$	38.54 $\frac{1}{2}$	"	1 "
1 $\frac{1}{2}$ "	$\frac{1}{2}$	19.27 $\frac{1}{2}$	"	15 days.
		9.63 $\frac{1}{2}$	"	7 $\frac{1}{2}$ "
		1.92 $\frac{1}{2}$	"	1 $\frac{1}{2}$ "

$$\$4617.29\frac{1}{2} = \text{interest for 9 yrs. 11m. 24d.}$$

$$\text{Otherwise 9 yrs. 11 mos. 24 days} = 9.98\frac{1}{3} \text{ years.}$$

$$\$462.50 \times 9.98\frac{1}{3} = \$4617.291\frac{2}{3}$$

(9)

$$\$9680.80 \times .03 = \$290.424 = \text{interest for 1 year.}$$

$$\$290.424 \times 14\frac{1}{2} = \$4182.744.$$

(10)

$$\$476.76 \times .0575 = \$27.4137 = \text{interest for 1 year.}$$

$$\$27.4137 \times 10\frac{2}{3} = \$292.4128 = \text{int. for 10 yrs. 8 mos.}$$

(11)

$$\$8900 \times .1125 = \$1001.25 = \text{interest for 1 year.}$$

4 mos.	$\frac{1}{3}$	\$1001.25
		6.

2 mos.	$\frac{1}{6}$	\$6007.50	= in. for 6ys	
1 mo.	$\frac{1}{12}$	333.75	= in. for 4ms	
15 days	$\frac{1}{8}$	166.875	= in. for 2ms	
10 days	$\frac{1}{6}$	83.4375	= in. for 1m	
2 days	$\frac{1}{30}$	41.71875	= in. for	15ds
1 day	$\frac{1}{60}$	27.8125	= in. for	10ds
		5.5625	= in. for	2ds
		2.78125	= in. for	1d

$$\$6669.4375$$

$$6\text{ys } 7\text{ms } 28\text{ds}$$

(12)

$$\$8160 \times .075 = \$612; \$612 \times 9\frac{1}{4} = \$5533.50.$$

(13)

$$\$412.90 \times .04875 = \$20.128875 = \text{interest for 1 year.}$$

$$\$20.128875 \times 6 = \$120.77325.$$

(14)

$$\$127.40 \times .125 = \$15.925 = \text{interest for 1 year.}$$

3 mos.	$\frac{1}{4}$ <hr style="width: 50%; margin: 0;"/> 3	$\$15.925$ <hr style="width: 50%; margin: 0;"/> 47.775 = int. for 3 yrs 3.98125 = int. for 3 ms .1327035 = int. for 3 ds
3 days	$\frac{1}{30}$	<hr style="width: 50%; margin: 0;"/> \$51.888954 = int. for 3 yrs 3 ms 3 ds

(15)

$$\$80.63 \times .0297 = \$2.394711 = \text{interest for 1 year.}$$

$$\$2.394711 \times 4.78 = \$11.44671858 = \text{int. for 4.78 yrs.}$$

(16)

$$\$106.70 \times .1347 = \$14.37249 = \text{interest for 1 year.}$$

$$\$14.37249 \times 11.113 = \$159.72148137 = \text{interest for 11.113 years.}$$

EXERCISE 67.

1. $\frac{1}{4}$ of 8 = 4 cents = \$0.04; $\frac{1}{4}$ of 7 = 3.5 cents = \$0.035; $\frac{1}{4}$ of 11 = 5.5 cents = \$0.055.
2. 2 yrs. 9 mos. = 33 mos.; $33 \div 2 = 16.5$ cents = \$0.165.
3. 16 yrs. 4 mos. = 196 mos.; $196 \div 2 = 98$ cents = \$0.98.

4. 5 yrs. 11 mos. = 71 mos.; $71 \div 2 = 35.5$ cents
= \$0.355.

5. 11 yrs. 1 mo. = 133 mos.; $133 \div 2 = 66.5$ cents
= \$0.665.

6. 10 yrs. 10 mos. = 130 mos.; $130 \div 2 = 65$ cents
= \$0.65.

7. 4 yrs. 5 mos. = 53 mos.; $53 \div 2 = 26.5$ cents
= \$0.265.

(8)

6 yrs. 3 mos. 12 days = 75 mos. 12 days.

$75 \div 2 = 37.5$ cents = interest for 75 mos.

$12 \div 6 = .2$ cents = interest for 12 days.

37.7 cents = \$0.377 = int. for 6 yrs. 3 mos.
12 days.

(9)

3 yrs. 3 mos. 3 days = 39 mos. 3 days.

$39 \div 2 = 19.5$ cents = interest for 39 mos.

$3 \div 6 = .05$ cents = interest for 3 days.

19.55 cts. = \$0.1955 = int. for 3 yrs 3 ms 3 dys

(10)

4 yrs. 7 mos. 10 days = 55 mos. 10 days.

$55 \div 2 = 27.5$ cents = interest for 55 mos.

$10 \div 6 = .16$ cents = interest for 10 days.

27.66 cts = \$0.2766 = int. for 4 yrs 7 mos 10 ds

(11)

1 yr. 9 mos. 25 days = 21 mos. 25 days.

$21 \div 2 = 10.5$ cents = interest for 21 mos.

$25 \div 6 = .416$ cents = interest for 25 days.

10.916 cts = \$0.10916 = int. for 1 yr 9ms 25ds

(12)

2 yrs. 7 mos. 17 days = 31 mos. 17 days.

 $31 \div 2 = 15.5$ cents = interest for 31 mos. $17 \div 6 = .283$ cents = interest for 17 days. $15.783 = \$0.15783 = \text{int. for 2ys 7 mos 17ds.}$

EXERCISE 38.

(1)

Interest of \$1 for 7 yrs. 9 ms. = 93 cents $\div 2 = \$0.465$ $\$0.465 \times 1904 = \885.36

(2)

Interest of \$1 for 4 yrs. 11 ms. = 59 cents $\div 2 = \$0.295$ $\$0.295 \times 274.80 = \81.066

(3)

Interest of \$1 for 2 yrs. 2 ms. 12 dys. = \$0.132

 $\$0.132 \times 671.90 = \88.6908

(4)

Interest of \$1 for 3 yrs. 3 ms. 3 days. = \$0.1955

 $\$0.1955 \times 213.27 = \41.694285

(5)

Interest of \$1 for 4 yrs. 4 ms. 4 days = \$0.260 $\frac{1}{3}$ $\$0.260\frac{1}{3} \times 49.73 = \$12.96295\frac{1}{3}$

(6)

Interest of \$1 for 5 yrs. 5 ms. 5 days = \$0.3258 $\frac{1}{3}$ $\$0.3258\frac{1}{3} \times 619.80 = \201.9515

(7)

Interest of \$1 for 6 yrs. 6 ms. 6 days = \$0.391

 $\$0.391 \times 27.60 = \10.7916

(8)

Interest of \$1 for 7 yrs. 7 ms. 7 days = \$0.456 $\frac{1}{2}$
 $\$0.456\frac{1}{2} \times 47.32 = \$21.58580\frac{1}{2}$

(9)

Interest of \$1 for 8 yrs. 8 ms. 8 days = \$0.521 $\frac{1}{2}$
 $\$0.521\frac{1}{2} \times 222.22 = \$115.85069\frac{1}{2}$

(10)

Interest of \$1 for 9 yrs. 9 ms. 9 days = \$0.586 $\frac{1}{2}$
 $\$0.586\frac{1}{2} \times 345.67 = \202.735455

(11)

Interest of \$1 for 10 yrs. 10 ms. 10 days = \$0.651 $\frac{1}{2}$
 $\$0.651\frac{1}{2} \times 7.23 \times \$514.31488\frac{1}{2}$

(12)

Interest of \$1 for 11 yrs. 11 ms. 11 days = \$0.716 $\frac{1}{2}$
 $\$0.716\frac{1}{2} \times 809 = \$579.918\frac{1}{2} = \$579.91816\frac{1}{2}$

(13)

Interest of \$1 for 3 yrs. 24 days = \$0.184
 $\$0.184 \times 207.40 = \38.1616

(14)

Interest of \$1 for 1 yr. 28 days = \$0.064 $\frac{1}{2}$
 $\$0.064\frac{1}{2} \times 98.20 = \$6.35026\frac{1}{2}$

(15)

Interest of \$1 for 2 yrs. 7 mos. 15 days = \$0.1575
 $\$0.1575 \times 76.42 = \12.03615

(16)

Interest of \$1 for 2 yrs. 5 ms. 20 days = \$0.148 $\frac{1}{2}$
 $\$0.148\frac{1}{2} \times 9146.70 = \1356.7605



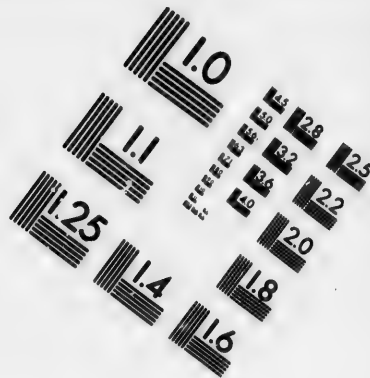
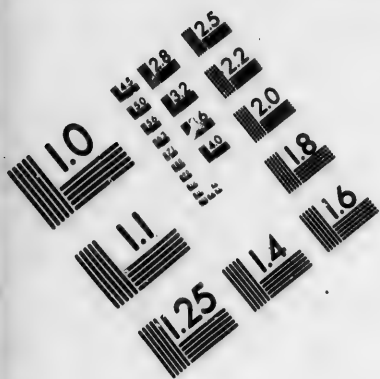
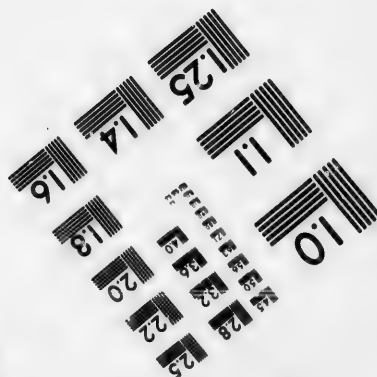
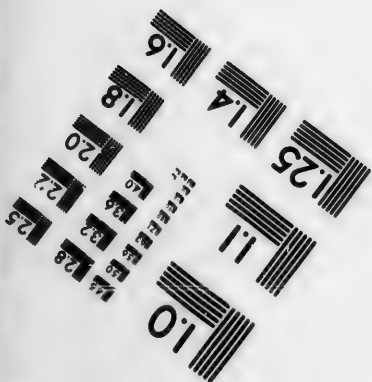
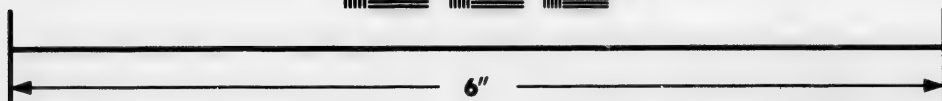
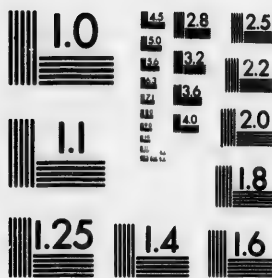


IMAGE EVALUATION TEST TARGET (MT-3)



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1.8 2.0 2.2 2.5 2.8 3.2 3.6 4.0 4.5 5.0 5.6 6.3 7.1 8.0 9.0 10.0 11.2 12.5 14.0 16.0 18.0 20.0 22.5 25.0 28.0 31.5 36.0 40.0 45.0 50.0 56.0 63.0 71.0 80.0 90.0 100.0

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

EXERCISE 69.

(1)

$$\$1000 \times .07 = \$70 = \text{interest for 1st year.}$$

$$\$1070 \times .07 = \$74.90 = \text{interest for 2nd year.}$$

$$\$1144.90 \times .07 = \$80.143 = \text{interest for 3rd year.}$$

$$\$1225.043 = \text{amount at end of 3rd year.}$$

$$\$1225.043 - \$1000 = \$225.043 = \text{interest.}$$

(2)

$$\$800 \times .06 = \$48 = \text{interest for 1st year.}$$

$$\$800 + \$48 = \$848 = \text{amount at end of 1st year.}$$

$$\$848 \times .06 = \$50.88 = \text{interest for 2nd year.}$$

$$\$848 + \$50.88 = \$898.88 = \text{amount at end of 2d year.}$$

$$\$898.88 \times .06 = \$53.9328 = \text{interest for 3d year.}$$

$$\$898.88 + \$53.9328 \times \$952.8128 = \text{amount at end of 3rd year.}$$

$$\$952.8128 \times .06 = \$57.168768 = \text{interest for 4th year.}$$

$$\$952.8128 + \$57.168768 = \$1009.981568 = \text{amount at end of 4th year.}$$

$$\$1009.981568 - \$800 = \$209.981568 = \text{interest.}$$

(3)

$$\$900 \times .06 = \$54 = \text{interest for 1st year.}$$

$$\$900 + \$54 = \$954 = \text{amount at end of 1st year.}$$

$$\$954 \times .06 = \$57.24 = \text{interest for 2nd year.}$$

$$\$954 + \$57.24 = \$1011.24 = \text{amount at end of 2d year.}$$

$$\$1011.24 \times .06 = \$60.6744 = \text{interest for 3rd year.}$$

$$\$1011.24 + \$60.6744 = \$1071.9144 = \text{amount at end of 3d year.}$$

$$\$1071.9144 \times .06 = \$64.314864 = \text{int. for 4th year.}$$

$$\$1071.9144 + \$64.314864 = \$1136.229264 = \text{amt. at end of 4th year.}$$

$$\$1136.229264 \times .06 = \$68.17375584 = \text{in. for 5th yr.}$$

$$\$1136.229264 + \$68.17375584 = \$1204.40301984 = \text{amt. at end of 5th year.}$$

$$\$1204.40301984 - \$900 = \$304.40301984 = \text{int.}$$

(4)

$$\$600 \times .04 = \$24 = \text{int. for 1st half-year.}$$

$$\$600 + \$24 = \$624 = \text{amt. at end of 1st half-year.}$$

$$\$624 \times .04 = \$24.96 = \text{int. for 2d half-year.}$$

$$\$624 + \$24.96 = \$648.96 = \text{amt. at end of 2d hf.-yr.}$$

$$\$648.96 \times .04 = \$25.9584 = \text{int. for 3d half-year.}$$

$$\$648.96 + \$25.9584 = \$674.9184 = \text{amt. at end of 3d half-year.}$$

$$\$674.9184 \times .04 = \$26.996736 = \text{int. for 4th half-yr.}$$

$$\$674.9184 + \$26.996736 = \$701.915136 = \text{amt. at end of 4th half-year.}$$

$$\$701.915136 - \$600 = \$101.915136 = \text{int.}$$

(5)

$$\$250 \times .035 = \$8.75 = \text{int. for 1st half-year.}$$

$$\$250 + \$8.75 = \$258.75 = \text{amt. at end of 1st hf.-yr.}$$

$$\$258.75 \times .035 = \$9.05625 = \text{int. for 2d half-year.}$$

$$\$258.75 + \$9.05625 = \$267.80625 = \text{amt. at end of 2d half-year.}$$

$$\$267.80625 \times .035 = \$9.37321875 = \text{in. for 3d. hf.-yr.}$$

$$\$267.80625 + \$9.37321875 = \$277.17946875 = \text{amt. at end of 3d half-year.}$$

$$\$277.17946875 \times .035 = \$9.70128140625 = \text{int. for 4th half-year.}$$

$$\$277.17946875 + \$9.70128140625 = \$286.88075015625 = \text{amt. at end of 2d year.}$$

$$\$286.88075015625 - \$250 = \$36.88075015625 = \text{int.}$$

(6)

$$\$880 \times .02 = \$17.60 = \text{int. for 1st quarter.}$$

$$\$880 + \$17.60 = \$897.60 = \text{amt. at end of 1st quar.}$$

$$\$897.60 \times .02 = \$17.952 = \text{int. for 2d quarter.}$$

$$\$897.60 + \$17.952 = \$915.552 = \text{amt. at end of 2d qr.}$$

(Continued on next page.)

(6) continued.

$$\$915.552 \times .02 = \$18.31104 = \text{int. for 3d quarter.}$$

$$\$915.552 + \$18.31104 = \$933.86304 = \text{amt. at end of 3d quarter.}$$

$$\$933.86304 \times .02 = \$18.6772608 = \text{int. for 4th quar.}$$

$$\$933.86304 + \$18.6772608 = \$952.5403008 = \text{amt. at end of 4th quarter.}$$

$$\$952.5403008 \times .02 = \$19.050806016 = \text{int. for 5th qr.}$$

$$\$952.5403008 + \$19.050806016 = \$971.591106816 = \text{amt. at end of 5th quarter.}$$

$$\$971.591106816 \times .02 = \$19.43182213632 = \text{int. for 6th quarter.}$$

$$\$971.591106816 + \$19.43182213632 = \$991.02292895232 = \text{amt. at end of 6th quarter.}$$

$$\$991.02292895232 - \$880 = \$111.02292895232 = \text{int.}$$

(7)

$$\$500 \times .075 = \$37.50 = \text{int. for 1st year.}$$

$$\$500 + \$37.50 = \$537.50 = \text{amt. at end of 1st year.}$$

$$\$537.50 \times .075 = \$40.3125 = \text{int. for 2d year.}$$

$$\$537.50 + \$40.3125 = \$577.8125 = \text{amt. at end of 2d year.}$$

$$\$577.8125 \times .075 = \$43.3359375 = \text{int. for 3d year.}$$

$$\$577.8125 + \$43.3359375 = \$621.1484375 = \text{amount.}$$

$$\$621.1484375 - \$500 = \$121.1484375 = \text{interest.}$$

(8)

$$\$400 \times .045 = \$18 = \text{int. for 1st half-year.}$$

$$\$400 + \$18 = \$418 = \text{amt. at end of 1st half-year.}$$

$$\$418 \times .045 = \$18.81 = \text{int. for 2d half-year.}$$

$$\$418 + \$18.81 = \$436.81 = \text{amt. at end of 2d hf.-yr.}$$

$$\$436.81 \times .045 = \$19.65645 = \text{int. for 3d half-year.}$$

$$\$436.81 + \$19.65645 = \$456.46645 = \text{amt. at end of 3d half-year.}$$

$$\$456.46645 \times .045 = \$20.54099025 = \text{int. for 4th hf.-yr.}$$

$$\$456.46645 + \$20.54099025 = \$477.00744025 = \text{amt.}$$

$$\$477.00744025 - \$400 = \$77.00744025 = \text{int.}$$

(9)

$$\$714.90 \times .025 = \$17.8725 = \text{int. for 1st quarter.}$$

$$\text{Add } 714.90$$

$$\text{Sum} = \$732.7725 = \text{amt. at end of 1st quar.}$$

$$\$732.7725 \times .025 = \$18.3193125 = \text{int. for 2d quar.}$$

$$\text{Add } 732.7725$$

$$\text{Sum} = \$751.09181 = \text{amt. at end 2d qr.}$$

$$\$751.09181 \times .025 = \$18.777294 = \text{int. for 3d quarter.}$$

$$\text{Add } 751.09181$$

$$\text{Sum} = \$769.8691 = \text{amt. at end of 2d qr.}$$

$$\$769.8691 \times .025 = \$19.246727 = \text{int. for 4th quar.}$$

$$\text{Add } 769.8691$$

$$\text{Sum} = \$789.1158 = \text{amt. at end 4th qr.}$$

$$\$789.1158 \times .025 = \$19.727895 = \text{int. for 5th quar.}$$

$$\text{Add } 789.1158$$

$$\text{Sum} = \$808.8437 = \text{amt. at end 5th qr.}$$

$$\$808.8437 \times .025 = \$20.221092 = \text{int. for 6th quar.}$$

$$\text{Add } 808.8437$$

$$\text{Sum} = \$829.0648 = \text{amt. at end 6th quar.}$$

$$\$829.0648 \times .025 = \$20.72662 = \text{int. for 7th quar.}$$

$$\text{Add } 829.0648$$

$$\text{Sum} = \$849.7914 = \text{amt. at end 7th qr.}$$

$$\$849.7914 \times .025 = \$21.244785 = \text{int. for 8th quar.}$$

$$\text{Add } 849.7914$$

$$\text{Sum} = \$871.0362 = \text{required amt.}$$

$$\text{Subtract } \$714.90$$

$$\text{Differ.} = \$156.1362 = \text{required int.}$$

(10)

$$\$794.60 \times .045 = \$35.757 = \text{int. for 1st half-year.}$$

$$\text{Add } 794.60$$

$$\text{Sum} = \$830.357 = \text{amt. at end of 1st half-yr.}$$

$$\$830.357 \times .045 = \$37.366065 = \text{int. for 2d half-year.}$$

$$\text{Add } 830.357$$

$$\text{Sum} = \$867.723065 = \text{amt. at end 2d hf.-yr.}$$

$$\$867.723065 \times .04\frac{1}{2} = \$39.047537925 = \text{in. 3d hf.-yr.}$$

$$\text{Add } 867.723065$$

$$\text{Sum} = \$906.7706 = \text{amt. requi'd.}$$

$$\text{Subtract } \$794.60$$

$$\text{Remainder} = \$112.1706 = \text{int. required.}$$

EXERCISE 70.

(1)

$$\text{Interest of \$1 at 7 per cent for 1 year} = \$0.07.$$

$$\text{Interest of \$1 at 7 per cent for 3 mos.} = \frac{1}{4} \text{ of } \$0.07 \\ = \$0.0175.$$

$$\text{Amount of \$1 at 7 per cent for 3 mos.} = \$1.0175.$$

$$\$740 \div 1.0175 = \$7400000 \div 10175 = \$727.2727 = \\ \text{present worth.}$$

$$\$740 - \$727.2727 = \$12.7273 = \text{discount.}$$

(2)

$$\text{Interest of \$1 at 9 per cent for 1 year} = \$0.09.$$

$$\text{Interest of \$1 at 9 per cent for 2 mos.} = \frac{1}{5} \text{ of } \$0.09 \\ = 0.015.$$

$$\text{Amount of \$1 for 2 mos. at 9 per cent} = \$1.015.$$

$$\$90 \div 1.015 = 90000 \div 1015 = \$88.6699 = \text{present worth.}$$

$$\$90 - \$88.6699 = \$1.3301 = \text{discount.}$$

(3)

Amount of \$1 for 6 months at 6 per cent = \$1.03.

$\$250 \div 1.03 = \$25000 \div 103 = \$242.7184 = \text{present worth.}$

$\$250 - \$242.7184 = \$7.2816 = \text{discount.}$

(4)

Amount of \$1 for 11 mos. at 11 per cent = $\$1.10\frac{1}{11}$.

$\$714.20 \div 1.10\frac{1}{11} = \$71420 \div 110\frac{1}{11} = 857040 \div 1321^* = \$648.7812 = \text{present worth.}$

$714.20 - \$648.7812 = \$65.4188 = \text{discount.}$

(5)

Amount of \$1 for 5 mos. at 8 per cent = $\$1.03\frac{1}{4}$.

$\$911.40 \div 1.03\frac{1}{4} = \$91140 \div 103\frac{1}{4} = \$273420 \div 310\frac{1}{2} = \$882.00 = \text{present worth.}$

$\$911.40 - \$882 = \$29.40 = \text{discount.}$

(6)

Amount of \$1 for 4 mos. at 7 per cent = $\$1.02\frac{1}{2}$.

$\$671.43 \div 1.02\frac{1}{2} = \$67143 \div 102\frac{1}{2} = \$201429 \div 307\frac{1}{2} = \$656.1205 = \text{present worth.}$

$\$671.43 - \$656.1205 = \$15.3095 = \text{discount.}$

(7)

Amount of \$1 for 2 years at 4 per cent = \$1.08.

$\$947.60 \div 1.08 = \$94760 \div 108 = \$877.4074 = \text{present worth.}$

$\$947.60 - \$877.4074 = \$70.1926 = \text{discount.}$

* Multiplying each by 12.

† Multiplying each by 3.

‡ Multiplying each by 3 to clear of fractions.

(8)

Amount of \$1 for 16 mos. at 7 per cent = \$1.09½.

\$888.93 ÷ 1.09½ = \$88893 ÷ 109½ = \$266679 ÷ 328
= \$813.0457 = present worth.

\$888.93 — \$813.0457 = \$75.8843 = discount.

(9)

Interest of \$1 for 1 year at 10 per cent = \$0.10.

Interest of \$1 for 47 days at 10 per cent = $\frac{47}{365}$ of \$0.10
= \$0.012½.

Amount of \$1 for 47 days at 10 per cent = \$1.012½.

\$7146.90 ÷ 1.012½ = \$714690 ÷ 101½ = \$52172370
÷ 7394 = \$7056.0413 = present worth.

\$7146.90 — \$7056.0413 = \$90.8587 = discount.

(10)

Amount of \$1 for 2 mos. at 7 per cent. = \$1.01½.

\$710 ÷ 1.01½ = \$71000 ÷ 101½ = \$426000 ÷ 607
= \$701.8121 = present worth.

\$710 — \$701.8121 = \$8.1879 = discount.

(11)

Amount of \$1 for 1½ mos. at 7 per cent. = \$1.008½.

\$1100 ÷ 1.008½ = \$1100000 ÷ 1008½ = \$4400000 ÷ 4035
= \$1090.4584 = present worth.

\$1100 — \$1090.4584 = \$9.5416 = discount.

(12)

Amount of \$1 for 2½ months at 6 per cent. = \$1.01½.

\$6714.83 ÷ 1.01½ = \$671483 ÷ 101½ = \$4028898 ÷ 607
= \$6637.3937 = present worth.

\$6714.83 — \$6637.3937 = \$77.4363 = discount.

EXERCISE 71.

(1)

42 days + 3 days = 45 days = $1\frac{1}{2}$ mos. = $\frac{1}{2}$ of a year.
 Interest of \$700 at 7 per cent. for 1 year = \$49.
 $\frac{1}{2}$ of \$49 = \$24.50 = discount required for 45 days.

(2)

57 + 3 = 60 days = 2 months = $\frac{1}{6}$ of a year.
 Interest of \$840 for 1 year at 8 per cent. = \$67.20.
 $\frac{1}{6}$ of \$67.20 = \$11.20 = discount required for 2 mos.

(3)

4 mos. + 3 days = 4 mos. and 3 days.

\$790 \times .05 = \$39.50 = interest for 1 year.

3 mos.	$\frac{1}{4}$	\$39.50	
		<hr/>	
		9.87 $\frac{1}{2}$	= interest for 3 mos.
1 mo.	$\frac{1}{12}$	3.29 $\frac{1}{4}$	= " " 1 mo.
3 days	$\frac{1}{40}$	.32 $\frac{1}{4}$	= " " 3 dys.
		<hr/>	

\$13.49 $\frac{1}{2}$ = disc. required for 4 m. 3 dys.

(4)

2 months + 3 days = 2 months and 3 days.

\$614.30 \times .07 = \$43.001 = interest for 1 year.

2 mos.	$\frac{1}{6}$	\$43.001	
		<hr/>	
		7.1668333	= interest for 2 mos.
3 days	$\frac{1}{40}$	.3583416	= " " 3 days.
		<hr/>	

\$7.5251749 = \$7.5251745 = discount
 required for 2 mos. 3 days.

(5)

7 mos + 3 days = 7 mos. and 3 days.

 $\$217.20 \times .09 = \$19.548 = \text{interest for 1 year.}$

6 mos.	$\frac{1}{2}$	$\$19.548$
--------	---------------	------------

1 mo.	$\frac{1}{6}$	$9.774 = \text{interest for 6 mos.}$
-------	---------------	--------------------------------------

3 days	$\frac{1}{20}$	$1.629 = \text{" " " 1 mo.}$
		$.1629 = \text{" " " 3 days.}$

$\$11.5659 = \text{discount required for 7 mos.}$
 3 days.

(6)

20 days + 3 days = 23 days.

 $\$94.80 \times .10 = \$9.48 = \text{interest for 1 year.}$

20 days	$\frac{1}{5}$	$\$9.48$
---------	---------------	----------

2 "	$\frac{1}{10}$	$.526\frac{2}{3} = \text{interest for 20 days.}$
-----	----------------	--

1 "	$\frac{1}{20}$	$.0526\frac{1}{2} = \text{" " " 2 "}$
-----	----------------	---------------------------------------

		$.026\frac{1}{4} = \text{" " " 1 "}$
--	--	--------------------------------------

$\$0.605\frac{1}{2} = \text{discount required for 23 dys.}$

EXERCISE 72.

(1)

$\$7000 : \$2700 :: \$1700 : A's \text{ profit} = \frac{\$2700 \times 1700}{7000}$
 $= \$655.71\frac{1}{2}.$

$\$7000 : \$4200 :: \$1700 : B's \text{ profit} = \frac{\$1700 \times 4200}{7000}$
 $= \$1020.$

 $\$655.71\frac{1}{2} + \$1020.00 = \$1675.71\frac{1}{2}.$ $\$1700.00 - \$1675.71\frac{1}{2} = \$24.28\frac{1}{2} = C's \text{ profit.}$

year.

(2)

$$\$29000 : \$17400 :: \$904.70 : B's \text{ loss}$$

$$= \frac{\$904.70 \times \$17400}{29000} = \$542.82.$$

$$\$904.70 - 542.82 = \$361.88 = C's \text{ loss.}$$

(3)

$$21 + 17 + 47 = 85 \text{ cows.}$$

$$85 : 21 :: \$307 : 1st \text{ share} = \frac{\$307 \times 21}{85} = \$75.84\frac{1}{2}.$$

$$85 : 17 :: \$307 : 2nd \text{ share} = \frac{\$307 \times 17}{85} = \$61.40.$$

$$85 : 47 :: \$307 : 3rd \text{ share} = \frac{\$307 \times 47}{85} = \$169.75\frac{1}{2}.$$

(4)

$$\$4 + \$7 + \$9 = \$20.$$

$$\$20 : \$4 :: \$7493 : A's \text{ share} = \frac{\$7493 \times 4}{20} = \$1498.60.$$

$$\$20 : \$7 :: \$7493 : B's \text{ share} = \frac{\$7493 \times 7}{20} = \$2622.55.$$

$$\$20 : \$9 :: \$7493 : C's \text{ share} = \frac{\$7493 \times 9}{20} = \$3371.85.$$

(5)

$$1\frac{1}{2} + 2\frac{1}{2} + 5\frac{1}{2} = 9\frac{1}{2}.$$

$$9\frac{1}{2} : 1\frac{1}{2} :: \$7500 : \text{share of 1st} = \$7500 \times 1\frac{1}{2} \div 9\frac{1}{2}$$

$$= \frac{\$7500 \times 7 \times 2}{4 \times 19} = \$1381.57\frac{1}{2}.$$

(Continued on next page.)

r 7 mos.

ear.

r 23 dys.

x 1700

000

x 4200

000

profit.

(5) continued.

$$9\frac{1}{2} : 2\frac{1}{2} :: \$7500 : \text{share of 2nd} = \$7500 \times 2\frac{1}{2} \div 9\frac{1}{2}$$

$$= \frac{\$7500 \times 5 \times 2}{2 \times 19} = \$1973.68\frac{4}{19}.$$

$$9\frac{1}{2} : 5\frac{1}{2} :: \$7500 : \text{share of 3d} = \$7500 \times 5\frac{1}{2} \div 9\frac{1}{2}$$

$$= \frac{\$7500 \times 21 \times 2}{4 \times 19} = \$4144.73\frac{1}{19}.$$

(6)

$$\$8900 : \$4700 :: \$3200 : \text{A's share} = \frac{\$3200 \times 4700}{8900}$$

$$= \$1689.88\frac{4}{11}.$$

$$\$3200 - \$1689.88\frac{4}{11} = \$1510.11\frac{7}{11} = \text{B's share.}$$

(7)

$$\$3 + \$4.20 + \$7.49 = \$14.69.$$

$$\$14.69 : \$3 :: \$9000 : \frac{\$9000 \times 3}{14.69} = \$1837.98\frac{72}{1469}$$

$$= \text{A's share.}$$

$$\$14.69 : \$4.20 :: \$9000 : \frac{\$9000 \times 4.20}{14.69}$$

$$= \$2573.17\frac{11}{1469} = \text{B's share.}$$

$$\$14.69 : \$7.49 :: \$9000 : \frac{\$9000 \times 7.49}{14.69}$$

$$= \$4588.83\frac{27}{1469} = \text{C's share.}$$

(8)

$$\$14900 - \$4250 = \$10650 = \text{total loss.}$$

$$1 : \frac{1}{4} :: \$10650 : \$10650 \times \frac{1}{4} = \$5325 = \text{A's share.}$$

$$1 : \frac{1}{3} :: \$10650 : \$10650 \times \frac{1}{3} = \$2130 = \text{B's share.}$$

$$1 : \frac{1}{6} :: \$10650 : \$10650 \times \frac{1}{6} = \$3195 = \text{C's share.}$$

(9)

$$\begin{aligned} \frac{1}{11} + \frac{2}{11} + \frac{1}{11} &= \frac{1}{11} + \frac{2}{11} + \frac{1}{11} = \frac{4}{11} \\ \frac{1}{11} : \frac{2}{11} &:: \$4942 : \$4942 \times \frac{2}{11} \div \frac{4}{11} \\ &= \frac{\$4942 \times 35}{171} = \$1011.5271 = \text{1st part.} \\ \frac{1}{11} : \frac{1}{11} &:: \$4942 : \$4942 \times \frac{1}{11} \div \frac{4}{11} \\ &= \frac{\$4942 \times 56}{171} = \$1618.4347 = \text{2nd part.} \\ \frac{1}{11} : \frac{1}{11} &:: \$4942 : \$4942 \times \frac{1}{11} \div \frac{4}{11} \\ &= \frac{\$4942 \times 80}{171} = \$2312.0414 = \text{3rd part.} \end{aligned}$$

(10)

$$\begin{aligned} \$7490 + \$2980 &= \$10470 = \text{whole debt.} \\ \$10470 : \$7490 &:: \$7490 : \frac{\$7490 \times 7490}{10470} \\ &= \$5358.171047 = \text{what A should receive.} \\ \$7490 - \$5358.171047 &= \$2131.821147 = \text{what B} \\ &\quad \text{should receive.} \end{aligned}$$

EXERCISE 73.

(1)

$$\begin{aligned} 40 \times 37 &= 1480 \\ 38 \times 52 &= 1872 \\ \hline \text{Sum} &= 3352 \\ &\quad \$4600 \times 1480 \\ 3352 : 1480 &:: \$4600 : \frac{\$4600 \times 1480}{3352} = \$2031.02113 \\ &= \text{A's share.} \\ \$4600 - \$2031.02113 &= \$2568.97117 = \text{B's share.} \end{aligned}$$

(2)

$$\$2000 \times 7 = \$14000$$

$$\$1800 \times 11 = \$19800$$

$$\$1600 \times 12 = \$19200$$

$$\text{Sum} = \$53000$$

$$\$53000 : \$14000 :: \$2400 : \frac{\$2400 \times 14000}{53000}$$

$$= \$633.96\frac{1}{3} = \text{A's share.}$$

$$53000 : 19800 :: \$2400 : \frac{\$2400 \times 19800}{53000}$$

$$= \$896.60\frac{2}{3} = \text{B's share.}$$

$$53000 : 19200 :: \$2400 : \frac{\$2400 \times 19200}{53000}$$

$$= \$869.43\frac{1}{3} = \text{C's share.}$$

(3)

$$34 \times 10 = 340$$

$$15 \times 36 = 540$$

$$\text{Sum} = 880$$

$$880 : 340 :: \$2000 : \frac{\$2000 \times 340}{880} = \$772.72\frac{2}{11}$$

$$= \text{A's share.}$$

$$\$2000 - \$772.72\frac{2}{11} = \$1227.27\frac{9}{11} = \text{B's share.}$$

Exercise 73.]

KEY.

197

(4)

$$27 \times 4 = 108$$

$$20 \times 5 = 100$$

$$24 \times 3\frac{1}{2} = 84$$

$$\text{Sum} = 292$$

$$292 : 108 :: \$120 : \frac{\$120 \times 108}{292} = \$44.38\frac{1}{3}.$$

$$292 : 100 :: \$120 : \frac{\$120 \times 100}{292} = \$41.09\frac{1}{3}$$

$$292 : 84 :: \$120 : \frac{\$120 \times 84}{292} = \$34.52\frac{1}{3}.$$

(5)

$$\$2400 \times 11 = \$26400$$

$$\$3000 \times 4 = \$12000$$

$$\$2000 \times 9 = \$18000$$

$$\$2600 \times 12 = \$31200$$

$$\text{Sum} = \$87600$$

$$\$87600 : \$26400 :: \$2500 : \frac{\$2500 \times 26400}{87600} = \$753.42\frac{1}{3} = \text{A's share.}$$

$$\$87600 : \$12000 :: \$2500 : \frac{\$2500 \times 12000}{87600} = \$342.46\frac{1}{3} = \text{B's share.}$$

$$\$87600 : \$18000 :: \$2500 : \frac{\$2500 \times 18000}{87600} = \$513.69\frac{1}{3} = \text{C's share.}$$

$$\$87600 : \$31200 :: \$2500 : \frac{\$2500 \times 31200}{87600} = \$890.41\frac{1}{3} = \text{D's share.}$$

N

(6)

$$\$700 \times 8 = \$5600$$

$$\$1000 \times 11 = 11000$$

$$600 \times 17 = 10200$$

$$\text{Sum} = \$26800$$

$$\$26800 : \$5600 :: \$950 : \frac{\$950 \times 5600}{26800} = \$198.50\frac{2}{3}.$$

$$\$26800 : \$11000 :: \$950 : \frac{\$950 \times 11000}{26800} = \$389.92\frac{4}{11}.$$

$$\$26800 : \$10200 :: \$950 : \frac{\$950 \times 10200}{26800} = \$361.56\frac{1}{17}.$$

(7)

$$\begin{array}{l} \$10000 \times 7 = \$70000 \\ 6000 \times 5 = 30000 \end{array} \left. \vphantom{\begin{array}{l} \$10000 \times 7 \\ 6000 \times 5 \end{array}} \right\} = \$100000 = \text{product of A's}$$

stock and time.

$$\$7000 \times 5 = 35000 = \text{do. B's do.}$$

$$\text{Sum} = \$135000$$

$$\$135000 : \$100000 :: \$3000 : \frac{\$3000 \times 100000}{135000}$$

$$= \$2222.22\frac{2}{3} = \text{A's share.}$$

$$\$3000 - \$2222.22\frac{2}{3} = \$777.77\frac{1}{3} = \text{B's share.}$$

(10)

$$\$35000 \times 2 = \$70000$$

$$24000 \times 3 = 72000$$

$$20000 \times 2 = 40000$$

$$\left. \vphantom{\begin{array}{l} \$35000 \times 2 \\ 24000 \times 3 \\ 20000 \times 2 \end{array}} \right\} = \$182000 = \text{A's st'k for 1 mo.}$$

$$\$11000 \times 5 = 55000 = \text{B's do. do.}$$

$$\$4000 \times 2 = 8000 = \text{C's do. do.}$$

$$\text{Sum} = \$245000$$

(Continued on next page.)

(10 continued.)

$$\begin{aligned} \$245000 : \$182000 :: \$9700 : \frac{\$9700 \times 182000}{245000} \\ = \$7205.71\frac{1}{2} = \text{A's share.} \end{aligned}$$

$$\begin{aligned} \$245000 : \$55000 :: \$9700 : \frac{\$9700 \times 55000}{245000} \\ = \$2177.55\frac{1}{2} = \text{B's share.} \end{aligned}$$

$$\begin{aligned} \$245000 : \$8000 :: \$9700 : \frac{\$9700 \times 8000}{245000} \\ = \$316.73\frac{1}{2} = \text{C's share.} \end{aligned}$$

EXERCISE 74.

(1)

From 70 cents the selling price
Take 62½ cents the buying price

The remainder 7½ cents = the gain per yard
7½ cents × 209 = \$15.67½ = whole gain.

(2)

From \$1.42 the selling price
Take \$1.29 the buying price

The remainder \$0.13 = the gain per bushel
\$0.13 × 8900 = \$1157 = the whole gain.

(3)

From 16 cents the buying price
Take 12½ cents the selling price

The remainder 3½ cents = the loss per cwt.
3½ cents × 780 = \$27.30 = the whole loss.

(4)

From \$5.47 the selling price

Take \$4.92 the buying price

The remainder \$0.55 = the gain per 1000.

$$\$0.55 \times 1142 = \$628.10 = \text{the whole gain.}$$

(5)

17 cwt. 2 qrs. 11 lbs. = 1761 lbs.; also at \$23 per cwt.

it is 23 cents per lb. *and the same*

From 23 cents the selling price

Take 18 cents the buying price

The remainder 5 cents = the gain per lb.

$$5 \text{ cents} \times 1761 = \$88.05 = \text{the whole gain.}$$

(6)

\$13.50 per cwt. = 13½ cents per lb.

From 13½ cents the selling price

Take 11 cents the buying price

The remainder 2½ cents = the gain per lb.

$$2\frac{1}{2} \text{ cents} \times 1143 = \$28.57\frac{1}{2} = \text{the whole gain.}$$

(7)

From \$17.43 the buying price

Take \$12.94 the selling price

The remainder \$4.49 = the loss per ton.

$$\$4.49 \times 63 = \$282.87 = \text{whole loss.}$$

(8)

From \$4.17 the selling price

Take \$3.37½ the buying price

The remainder \$0.79½ = the gain per sheep

$$\$0.79\frac{1}{2} \times 47 = \$37.36\frac{1}{2} = \text{whole gain.}$$

EXERCISE 75.

(1)

I want to gain \$10 on \$100, or 10 cents on \$1.

Hence selling price $\$1.10 \times 293 = \322.30 .

(2)

\$17 per \$100 = 17 cents per \$1.

Hence selling price $= \$1.17 \times 890 = \1041.30 .

(3)

 $\$1.23 \times 630 = \$774.90 =$ whole buying price.\$8 per \$100 = 8 cents per \$1; $\$1 - 8 \text{ cents} = \0.92 .Hence selling price $= \$0.92 \times 774.90 = \712.908 .

(4)

44 cents $\times 950 = \$418.00 =$ cost of whole.

\$33 per \$100 = 33 cents per \$1.

 $\$1.33 \times 418 = \$555.94 =$ selling price.

(5)

 $\$5.22 \times 411 = \$2145.42 =$ whole cost.

\$12.50 per \$100 = 12½ cents per \$1.

 $\$1.12\frac{1}{2} \times 2145.42 = \2413.5975 .

(6)

 $\$2.80 \times 512 = \$1433.60 =$ whole buying price.\$15 per \$100 = 15 cents per \$1; $\$1 - 15 \text{ cents} = \0.85 . $\$0.85 \times 1433.60 = \$1218.56 =$ selling price.

(7)

7 cents $\times 64980 = \$4548.60 =$ whole buying price.

\$24 per \$100 = 24 cents per \$1.

 $\$1.24 \times 4548.60 = \$5640.264 =$ selling price.

(8)

$$\$5.22 \times 908 = \$4739.76 = \text{buying price.}$$

$$\$1\frac{1}{2} \text{ per } \$100 = 1\frac{1}{2} \text{ cents per } \$1; \$1 - 1\frac{1}{2} \text{ cents} = \$0.98\frac{1}{2}.$$

$$\$0.98\frac{1}{2} \times 4739.76 = \$4668.6636 = \text{selling price.}$$

EXERCISE 76.

(1)

$$\$26.25 - \$24 = \$2.25 = \text{gain on } \$24.$$

$$\frac{\$2.25 \times 100}{24}$$

$$\$24 : \$100 :: \$2.25 : \frac{\$2.25 \times 100}{24} = 9\frac{3}{4} \text{ per cent.}$$

(2)

$$\$17.80 \times 279 = \$4966.20 = \text{whole buying price.}$$

$$\$5570 - \$4966.20 = \$603.80 = \text{whole gain.}$$

$$\frac{603.80 \times 100}{4966.20}$$

$$\$4966.20 : \$100 :: \$603.80 : \frac{603.80 \times 100}{4966.20}$$

$$= 12\frac{3228}{24831} = \text{gain per cent.}$$

(3)

$$\$2.30 \times 212 = \$487.60 = \text{whole cost.}$$

$$\$600 - \$487.60 = \$112.40 = \text{whole gain.}$$

$$\frac{112.40 \times 100}{487.60}$$

$$\$487.60 : \$100 :: \$112.40 : \frac{112.40 \times 100}{487.60}$$

$$= 23\frac{112}{4876} \text{ per cent.}$$

(4)

$$\$7.40 \times 93 = \$688.20 = \text{whole cost.}$$

$$\$688.20 - \$651 = \$37.20 = \text{whole loss.}$$

$$\frac{37.20 \times 100}{688.20}$$

$$\$688.20 : \$100 :: \$37.20 : \frac{37.20 \times 100}{688.20}$$

$$= 5\frac{185}{47} \text{ per cent.}$$

(5)

$$\$93.40 \times 205 = \$19147 = \text{whole cost.}$$

$$\$20987 - \$19147 = \$1840 = \text{whole gain.}$$

$$\$19147 : \$100 :: \$1840 : \frac{1840 \times 100}{19147} = 9.6117 \text{ per ct.}$$

(8)

$$\$7400 - \$6250 = \$1150 = \text{whole loss.}$$

$$\$7400 : \$100 :: \$1150 : \frac{1150 \times 100}{7400} = 15.54 \text{ per cent.}$$

EXERCISE 77.

(1)

$$\$100 + \$18 = \$118$$

$$\$118 : \$100 :: \$1.70 : \frac{\$1.70 \times 100}{118} = \$1.440678$$

(2)

$$\$100 + \$29 = \$129$$

$$\$129 : \$100 :: \$324 : \frac{\$324 \times 100}{129} = \$251.16279$$

(3)

$$\$100 - \$11 = \$89$$

$$\$89 : \$100 :: \$1780 : \frac{\$1780 \times 100}{89} = \$2000$$

= whole buying price.

$$\$2000 \div 356 = \$5.61798 \text{ per bushel.}$$

(4)

$$\$100 - \$14 = \$86$$

$$\$86 : \$100 :: 8\frac{2}{10} \text{ cents} : \frac{8\frac{2}{10} \text{ cents} \times 100}{86}$$

$$= 10\frac{1}{4} \text{ cents} = \text{buying price.}$$

(5)

$$\$100 + \$43 = \$143$$

$$\$143 : \$100 :: \$9490 : \frac{\$9490 \times 100}{143} = \$6636.36$$

$$= \text{buying price.}$$

(6)

$$\$6.72 \times .20 = \$1.344 = \text{commission on each barrel.}$$

$$\$111 : 100 :: \$6.72 : \frac{\$6.72 \times 100}{111} = \$6.05405$$

$$= \text{original cost per barrel.}$$

$$\$6.05405 + \$1.344 = \$7.39805 = \text{total cost per brl.}$$

(7)

$$\$100 + \$9 = \$109$$

$$\$109 : \$100 :: \$145 : \frac{\$145 \times 100}{109} = \$133.027523$$

$$= \text{buying price.}$$

(8)

$$\$100 + \$31 = \$131$$

$$\$131 : \$100 :: \$12 : \frac{\$12 \times 100}{131} = \$9.160305$$

$$= \text{buying price.}$$

EXERCISE 78.

(1)

$$11 \text{ cents} \times 207 = \$22.77; \$22.77 \div 34\frac{1}{2} \\ = \$45.54 \div 69 = \$0.66.$$

(2)

$$10 \text{ cents} \times 293 = \$29.30 = \text{price of eggs.} \\ 18 \text{ cents} \times 47 = \$8.46 = \text{price of raisins.} \\ 14 \text{ cents} \times 9 = \$1.26 = \text{" loaf sugar.} \\ 6 \text{ cents} \times 23 = \$1.38 = \text{" rice.} \\ \$8.46 + \$1.26 + \$1.38 = \$11.10 = \text{price of raisins,} \\ \text{sugar and rice.} \\ \$29.30 - \$11.10 = \$18.20 = \text{cost of nails.} \\ \$18.20 \div \$0.05 = 1820 \div 5 = 364 \text{ lbs.}$$

(3)

$$27 \text{ cents} \times 91 = \$24.57 = \text{worth of figs.} \\ \$24.57 \div \$0.43 = 2457 \div 43 = 57\frac{2}{3} \text{ yds.}$$

(4)

$$\$33.70 \times 9 = \$303.30 = \text{worth of cows.} \\ \$303.30 \div 84 = \$3.61\frac{1}{4} = \text{price of a sheep.}$$

(5)

$$\$1.73 \times 98 = \$169.54 = \text{worth of silk.} \\ \$169.54 - \$14.20 = \$155.34 = \text{worth of broad cloth.} \\ \$155.34 \div 23 = \$6.75\frac{2}{3} = \text{worth of cloth per yd.}$$

(6)

$$\$4.90 \text{ per cent} = 4\frac{9}{10} \text{ cents per lb.} \\ 4\frac{9}{10} \text{ cents} \times 607 = \$29.743 = \text{worth of pork.} \\ \$29.743 \div 409 = \$0.072\frac{224}{1000} = \text{worth of cheese per lb.}$$

(7)

$$\$1.35 \times 420 = \$567 = \text{worth of wheat.}$$

$$\$567 - \$207.50 = \$359.50 = \text{cost of flour.}$$

$$\$359.50 \div 11983\frac{1}{2} = \$1078.50 \div 35950 = \$0.03$$

$$= 3 \text{ cents per lb.}$$

$$3 \text{ cents} \times 100 = \$3.00 = \text{cost of a cwt of flour.}$$

(8)

$$11 \text{ cents} \times 423 = \$46.53 = \text{worth of sugar.}$$

$$\$46.53 \div \$0.23 = 4653 \div 23 = 202.304\frac{1}{2} \text{ quarts.}$$

EXERCISE 79.

(1)

$$\$714.93 \times \frac{1}{4} = £178.7325 = £178 \text{ 14s. } 7\frac{1}{2}\text{d.}$$

(2)

$$\$914.90 \times \frac{1}{3} = £365.96 = £365 \text{ 19s. } 2\frac{1}{2}\text{d.}$$

(3)

$$\$611.20 \times \frac{1}{10} = £183.36 = £183 \text{ 7s. } 2\frac{1}{2}\text{d.}$$

(4)

$$\$43.92 \times \frac{1}{3} = £17.568 = £17 \text{ 11s. } 4\frac{1}{2}\text{d.}$$

(5)

$$£293 \text{ 17s. } 4\text{d.} = £293.8666; £293.86 \div \frac{1}{4} = \$1175.463.$$

(6)

$$£294 \text{ 11s. } 11\frac{1}{2}\text{d.} = £294.597916; £294.597916 \div \frac{1}{3}$$

$$= \$785.594.$$

(7)

$$£247 \text{ 2s. } 5\frac{1}{2}\text{d.} = £247.121875 \div \frac{1}{30} = \$1059.09375.$$

(8)

$$\begin{aligned} £89\ 11s. 10\frac{1}{2}d. &= £89.59375 = £89.59375 \div \frac{1}{4} \\ &= \$358.37\frac{1}{2}. \end{aligned}$$

(9)

$$\$994.70 \div \$4.867 = £204.3764 = £204\ 7s. 6\frac{1}{2}d. +$$

(10)

$$\$896.93 \div \$4.867 = £184.28806 = £184\ 5s. 9d. +$$

(11)

$$\$1020.11 \div \$4.867 = £209.5972 = £209\ 11s. 11\frac{1}{2}d. +$$

(12)

$$\$89.74 \div \$4.867 = £18.4384 = £18\ 8s. 9d. +$$

(13)

$$£29\ 14s. 11\frac{1}{2}d. = £29.746875 \times 4.867 = \$144.778039625.$$

(14)

$$£294\ 16s. 2\frac{1}{2}d. = £294.810416 \times 4.867 = \$1434.84229 +$$

(15)

$$£411\ 16s. 7d. = £411.82916 \times 4.867 = \$2004.3725.$$

(16)

$$£843\ 9s. 0d. = £843.45 \times 4.867 = \$4105.17115.$$

(17)

$$\begin{aligned} £294\ 11s. 10d. &= £294.5916; £294.5916 \div \frac{1}{4} \\ &= \$785.577. \end{aligned}$$

(18)

$$\$2947.80 \div \$4.867 = \$605.6708 = £605\ 13s. 5d. +$$

(19)

$$\$1291.10 \times 4 = £516.44 = £516 \text{ 8s. } 9\frac{1}{2}\text{d.}$$

(20)

$$£470 \text{ 10 } 8\frac{1}{2} = £470.984375; £470.984375 \times 4.867 \\ = \$2292.28095 +$$

EXERCISE 80.

(1)

$$\frac{1}{7} \text{ of } 77 = 11; 11 \times 3 = 33 = \frac{3}{7} \text{ of } 77; 33 \div 3 = 11 \\ \therefore \frac{3}{7} \text{ of } 77 \text{ is } 3 \text{ times } 11.$$

(2)

$$\frac{1}{4} \text{ of } 49 = 12\frac{1}{4}; 12\frac{1}{4} \times 4 = 49 = \frac{4}{5} \text{ of } 49; 49 \div 5 = 9\frac{4}{5} \\ \therefore \frac{4}{5} \text{ of } 49 \text{ is } 5\frac{4}{5} \text{ times } 9\frac{4}{5}.$$

(3)

$$\frac{1}{9} \text{ of } 130 = 14\frac{2}{9}; 14\frac{2}{9} \times 9 = 127 = \frac{7}{9} \text{ of } 130; 127 \div 7 \\ = 18\frac{1}{7} \therefore \frac{7}{9} \text{ of } 130 \text{ is } 18\frac{1}{7} \text{ times } 7.$$

(4)

$$\frac{1}{2} \text{ of } 70 = 35; 35 \times 2 = 70 = \frac{2}{3} \text{ of } 70; 70 \div 3 = 23\frac{1}{3} \\ \therefore \frac{2}{3} \text{ of } 70 \text{ is } 3\frac{1}{3} \text{ times } 23\frac{1}{3}.$$

(5)

$$\frac{1}{3} \text{ of } 54 = 18; 18 \times 3 = 54 = \frac{3}{4} \text{ of } 54; 54 \div 4 = 13\frac{1}{2} \\ \therefore \frac{3}{4} \text{ of } 54 \text{ is } 4 \text{ times } 13\frac{1}{2}.$$

(6)

$$\text{If } 72 = \frac{1}{11} \text{ of a number, } \frac{1}{11} = \frac{1}{11} \text{ of } 72 = 6\frac{2}{11}; \text{ if } 12 = \frac{1}{11}, \\ 12 \times 11 = 132 = \text{required number.}$$

$$\text{Then } 132 \text{ is as many times } 5 \text{ as } 132 \text{ is as many times } 5 \\ \text{as } 5 \text{ is contained times in } 132.$$

$$132 \div 5 = 26\frac{2}{5} \therefore 72 \text{ is } \frac{6}{11} \text{ of } 26\frac{2}{5} \text{ times } 5.$$

(7)

If 121 is $\frac{1}{11}$ of a certain number, $\frac{1}{11}$ of that number will be $\frac{1}{11}$ of 121 which is 11; if 11 is $\frac{1}{11}$ of a certain number, 12 times 11 which is 132 is the required number.

132 is as many times 10 as 10 is contained times in 132 which is $13\frac{1}{2}$.

Therefore 121 is $\frac{1}{11}$ of $13\frac{1}{2}$ times 10.

(8)

If 48 is $\frac{2}{3}$ of a certain number, $\frac{1}{3}$ of that number will be $\frac{1}{3}$ of 48 which is 6.

If 6 is $\frac{1}{8}$ of a certain number, 8 times 6 or 48 will be the required number.

48 is as many times 7 as 7 is contained times in 48 which is $48 \div 7 = 6\frac{6}{7}$.

Therefore 48 is $\frac{2}{3}$ of $6\frac{6}{7}$ times 7.

(9)

If 78 is $\frac{1}{11}$ of a certain number, $\frac{1}{11}$ of that number will be $\frac{1}{11}$ of 78 which is 13.

If 13 be $\frac{1}{11}$ of a certain number $13 \times 11 = 143$ will be that number.

143 is as many times 11 as 11 is contained times in 143 which is 13.

Therefore 78 is $\frac{1}{11}$ of 13 times 11.

(10)

$\frac{1}{5}$ of 25 is 5; then 5 is $\frac{2}{5}$ of what number?

If 5 be $\frac{2}{5}$ of a number, $\frac{1}{5}$ of that number will be $\frac{1}{2}$ of 5 which is $\frac{5}{2}$.

If $\frac{5}{2}$ be $\frac{1}{5}$ of a number, that number will be $\frac{5}{2} \times 5 = 5\frac{5}{2}$.

Therefore $\frac{1}{5}$ of 25 is $\frac{2}{5}$ of $5\frac{5}{2}$.

(11)

$\frac{1}{6}$ of 42 = 6 times $\frac{1}{6}$ of 42 = 6×6 ; then 36 is $\frac{1}{6}$ of what number?

If 36 be $\frac{1}{6}$ of a number, $\frac{1}{6}$ of that number will be $\frac{1}{6}$ of 36 which is $7\frac{1}{2}$.

If $7\frac{1}{2}$ be $\frac{1}{6}$ of a number, that number will be 11 times $7\frac{1}{2}$ which is 79 $\frac{1}{2}$.

Therefore $\frac{1}{6}$ of 42 is $\frac{1}{6}$ of 79 $\frac{1}{2}$.

(12)

$\frac{1}{7}$ of 81 = 7 times $\frac{1}{7}$ of 81 = 7 times 9 = 63; then 63 is $\frac{1}{7}$ of what number?

If 63 be $\frac{1}{7}$ of a number, $\frac{1}{7}$ of that number will be $\frac{1}{7}$ of 63 which is 21.

If 21 be $\frac{1}{7}$ of a number, that number will be 10 times 21 which is 210.

Therefore $\frac{1}{7}$ of 81 is $\frac{1}{7}$ of 210.

(13)

$\frac{1}{4}$ of 99 = 4 times $\frac{1}{4}$ of 99 = 4 times 9 = 36; then 36 is $\frac{1}{4}$ of what number?

If 36 be $\frac{1}{4}$ of a number, $\frac{1}{4}$ of that number will be $\frac{1}{4}$ of 36 which is 9.

If 9 be $\frac{1}{4}$ of a number, that number will be 5 times 9 which is 45.

Therefore $\frac{1}{4}$ of 99 is $\frac{1}{4}$ of 45.

(14)

If 8 cows give 44 lbs. 1 cow will give $\frac{1}{8}$ of 44 lbs. which is $5\frac{1}{2}$ lbs.

If 1 cow gives $5\frac{1}{2}$ lbs. 11 cows will give 11 times $5\frac{1}{2}$ which is 60 $\frac{1}{2}$ lbs.

Therefore if 8 cows give 44 lbs. 11 cows will give 60 $\frac{1}{2}$ lbs.

Exo

If 9

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i. e.

(15)

If 9 barrels cost \$27, 1 barrel will cost $\frac{1}{9}$ of \$27 which is \$3.

If 1 barrel costs \$3, 23 barrels will cost 23 times \$3 which is \$69.

Therefore if \$27 pay for 9 barrels, 23 barrels will cost \$69.

(16)

If 13 days' work cost \$7.80, 1 day's work will cost $\frac{1}{13}$ of \$7.80 which is 60 cents.

\$19.80 will pay for as many days' work as 60 cents is contained times in \$19.80 which is $\$19.80 \div \$0.60 = 1980 \div 60 = 33$.

Therefore if 13 days' work cost \$7.80, \$19.80 will pay for 33 days' work.

(17)

If A and B can do the work in 4 days, in 1 day they will together do $\frac{1}{4}$ of it, and if A alone can do the work in 9 days, in 1 day he can do $\frac{1}{9}$ of it.

Then $\frac{1}{4} - \frac{1}{9} = \frac{9}{36} - \frac{4}{36} = \frac{5}{36}$ the part B can do in 1 day, and he will require as many times 1 day to finish it as $\frac{5}{36}$ is contained times in the whole, i. e. $1 \div \frac{5}{36} = \frac{36}{5} = 7\frac{1}{5}$ days.

(18)

If A can do the whole in 10 days, in 1 day he can do $\frac{1}{10}$ of it; if B can do the whole in 7 days in 1 day he can do $\frac{1}{7}$ of it; and if C can do the whole in 12 days in 1 day he can do $\frac{1}{12}$ of it.

Therefore together they will do $\frac{1}{10} + \frac{1}{7} + \frac{1}{12} = \frac{43}{420}$ of it in 1 day, and to finish it they will require as many times 1 day as $\frac{43}{420}$ is contained times in the whole, i. e. $1 \div \frac{43}{420} = \frac{420}{43} = 9\frac{33}{43}$ days.

(19)

A, B, and C can together do the work in 15 days, therefore in 1 day they would do $\frac{1}{15}$ of it.

A, working alone, can finish it in 35 days and therefore in 1 day he can do $\frac{1}{35}$ of it.

B, working alone, can do the work in 42 days, hence in 1 day he can do $\frac{1}{42}$ of it.

Therefore B and C, working together, can do $\frac{1}{35} + \frac{1}{42} = \frac{13}{210}$ of it in 1 day, and A can do $\frac{1}{15} - \frac{13}{210} = \frac{1}{70}$ of it in 1 day.

And he would require as many times 1 day to finish it as $\frac{1}{70}$ is contained times in the whole, i. e. $1 \div \frac{1}{70} = 70$ days.

(20)

$\frac{3}{4}$ of $\frac{2}{3}$ of $\frac{3}{4} = \frac{1}{10}$; \$10.50 is $\frac{1}{10}$ of the price of the cow and hence the price is 10 times \$10.50 which is \$105.

(21)

$\frac{3}{4}$ of $\frac{2}{3}$ of $\frac{2}{3}$ of $\frac{1}{4} = \frac{1}{15}$; \$1000 is $\frac{1}{15}$ of the price hence $\frac{1}{4}$ of \$1000 which is \$250 is $\frac{1}{15}$ of the price and hence the price is 15 times \$250 which is \$3750.

(22)

If 1 bush. of wheat be worth \$1.40, 27 bush. will be worth $\$1.40 \times 27 = \37.80 and if 1 bush. be worth \$1.10, 11 bush. will be worth $\$1.10 \times 11 = \12.10 and will be worth $\$37.80 + \12.10 , i. e. \$49.90.

If 38 bush. be worth \$49.90, 1 bush. will be worth $\frac{1}{38}$ of \$49.90 which is $\$49.90 \div 38 = \$1.31\frac{1}{19}$.

Exercise 80.]

KEY.

213

(23)

$$15 \text{ gal. at } \$4.80 = \$72.00$$

$$12 \text{ " at } \$3.70 = 44.40$$

$$10 \text{ " at } \$2.90 = 29.00$$

Mixture = 37 gal. which is worth \$145.40

If 37 gal. be worth \$145.40, 1 gal. will be worth $\frac{1}{37}$ of \$145.40 which is $\$145.40 \div 37 = \3.9234 .

(24)

$\frac{1}{2} + \frac{2}{3} + \frac{1}{6} = \frac{3}{2}$; if $\frac{3}{2}$ of my sheep number 80, $\frac{1}{2}$ will number the $\frac{1}{2}$ of 80 which is 4.

If 4 be $\frac{1}{2}$ of my sheep, the whole number will be 21 times 4 which is 84.

(25)

$\frac{1}{2} + \frac{2}{3} = \frac{7}{6}$ = part of the post in ground and in water. Therefore $\frac{7}{6} - \frac{1}{2} = \frac{2}{3}$ = part above water = 9 feet by question.

If $\frac{2}{3} = 9$ ft., $\frac{1}{2}$ will equal $\frac{1}{2}$ of 9 ft. = $4\frac{1}{2}$ ft., and if $\frac{1}{2}$ of the post is equal to $4\frac{1}{2}$ ft., the whole must equal 20 times $4\frac{1}{2}$ ft. which is 90 ft.

(26)

Since A walks 3 miles and B $3\frac{1}{2}$ miles per hour and they walk in opposite directions they approach one another at the rate of $6\frac{1}{2}$ miles per hour.

$100 \div 6\frac{1}{2} = 15\frac{2}{3}$ hrs. = time before they meet.

Since B walks 3 miles per hour he will walk $3 \times 15\frac{2}{3} = 46\frac{2}{3}$ miles before he meets A, or the latter will walk $3\frac{1}{2} \times 15\frac{2}{3} = 53\frac{1}{3}$ miles before he meets B.

(27)

Since they travel in the same direction A at the rate of 5 miles per hour, and B at the rate of $3\frac{1}{2}$ miles per hour, A will gain on B at the rate of $1\frac{1}{2}$ miles per hour, and he has to gain the whole circumference of the island or 60 miles.

Hence time that elapses before A overtakes B will be $60 \div 1\frac{1}{2} = 40$ hours and distance travelled by A, will be $40 \times 5 = 200$ miles.

(28)

$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} = \frac{47}{60}$; what number is that of which $\frac{47}{60}$ is 104?

If $\frac{47}{60}$ be 104, $\frac{1}{60}$ will $\frac{1}{47}$ of 104 which is $\frac{104}{47}$; and if $\frac{1}{60}$ be $\frac{104}{47}$ the number required will be $\frac{104}{47} \times 60 = 109\frac{2}{47}$.

(29)

If $\frac{1}{2} = \frac{1}{11}$ and 2, the difference between $\frac{1}{2}$ and $\frac{1}{11}$ must be 2; i. e. $\frac{1}{2} - \frac{1}{11} = 2$, or $\frac{1}{11} = 2$.

If $\frac{1}{11}$ of a number be 2, the number itself will be 44 times 2, which is 88.

(30)

$\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{1}{4} = \frac{1}{24}$; $11\frac{1}{2}$ is $\frac{1}{24}$ of the last product, hence the product in question is $\frac{58}{3} \div \frac{1}{24} = \frac{58}{3} \times 24 = 36$.

$36 \div 3 = 12 =$ sum spoken of; $12 - 7 = 5 = 2^{\text{nd}}$ quotient.

$5 \times 11 = 55 =$ remainder spoken of.

$55 + 5 = 60 = \frac{2}{3}$ of the 1st quotient; hence 1st quo-

$$\text{tient} = \frac{60 \times 8}{3} = 160.$$

$$160 \times 4 = 640.$$

EXERCISE 81.

(1)

$$17^2 = 17 \times 17 = 289.$$

(2)

$$23^3 = 23 \times 23 \times 23 = 12167.$$

(3)

$$279^2 = 279 \times 279 = 77841.$$

(4)

$$81^3 = 81 \times 81 \times 81 = 531441.$$

(5)

$$6^4 = 6 \times 6 \times 6 \times 6 = 1296.$$

(6)

$$5^5 = 5 \times 5 \times 5 \times 5 \times 5 = 3125.$$

(7)

$$4^6 = 4 \times 4 \times 4 \times 4 \times 4 \times 4 = 4096.$$

(8)

$$3^7 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 2187.$$

(9)

$$2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256.$$

(10)

$$3^9 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 19683.$$

(11)

$$7^3 = 7 \times 7 \times 7 = 343.$$

(12)

$$11^4 = 11 \times 11 \times 11 \times 11 = 14641.$$

(13)

$$9^6 = 9 \times 9 \times 9 \times 9 \times 9 \times 9 = 531441.$$

(14)

$$\left(\frac{3}{2}\right)^5 = \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} = \frac{243}{32}.$$

(15)

$$1225^2 = 1225 \times 1225 = 1500625.$$

(16)

$$4837^2 = 4837 \times 4837 = 23396569.$$

(17)

$$\left(4\frac{1}{4}\right)^3 = \left(\frac{17}{4}\right)^3 = \frac{17}{4} \times \frac{17}{4} \times \frac{17}{4} = \frac{4913}{64} = 76\frac{49}{64}.$$

(18)

$$29^3 = 29 \times 29 \times 29 = 24389.$$

(19)

$$\left(2\frac{1}{3}\right)^4 = \left(\frac{5}{3}\right)^4 = \frac{5}{3} \times \frac{5}{3} \times \frac{5}{3} \times \frac{5}{3} = \frac{625}{81} = 7\frac{67}{81}.$$

(20)

$$3^{10} = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 59049.$$

EXERCISE 82.

(1)

$$\begin{array}{r} 1296(36 \\ 9 \\ \hline 66)396 \\ 396 \\ \hline \end{array}$$

(2)

$$\begin{array}{r} 3969(63 \\ 36 \\ \hline 123)369 \\ 369 \\ \hline \end{array}$$

(3)

$$\begin{array}{r} 15876(126 \\ 1 \\ \hline 22)58 \\ 44 \\ \hline 246)1476 \\ 1876 \end{array}$$

(4)

$$\begin{array}{r} 53361(231 \\ 4 \\ \hline 43)133 \\ 129 \\ \hline 461)461 \\ 461 \end{array}$$

(5)

$$\begin{array}{r} 142884(378 \\ 9 \\ \hline 67)528 \\ 469 \\ \hline 748)5984 \\ 5984 \end{array}$$

(6)

$$\begin{array}{r} 998001(999 \\ 81 \\ \hline 189)1880 \\ 1701 \\ \hline 1989)17901 \\ 17901 \end{array}$$

(7)

$$\begin{array}{r} 244036(494 \\ 16 \\ \hline 89)840 \\ 801 \\ \hline 984)3936 \\ 3936 \end{array}$$

(8)

$$\begin{array}{r} 395641(629 \\ 36 \\ \hline 122)356 \\ 244 \\ \hline 1249)11241 \\ 11241 \end{array}$$

(9)

(81)

(10)

756.25)27.5

4

11397.4849(106.759

1

47)356

329

206)1397

1236

54.5)2725

2725

212.7)161.48

148.89

213.45)12.5949

10.6725

213.509)1.922400

1.921581

.000819

(11)

(12)

98123.478916(313.246

9

6712914.23(2590.929

4

61)81

61

45)271

225

623)2023

1869

509)4629

4581

626.2)154.47

125.24

5180.9)4814.23

4662.81

626.44)29.2389

25.0576

5181.82)151.4200

103.6364

626.486)4.181310

3.758916

5181.849)47.783600

46.636641

.422394

1.146959

(13)

918767)958.523

81

185)1087

925

1908)16267

15264

1916.5)1003.00

958.25

1917.02)44.7500

38.3404

1917.043)6.409600

5.751129

.658471

(14)

4291 = 429.75(20.7304

4.

40.7)29.75

28.49

41.43)1.2600

1.2429

41.4604).01710000

.01658416

.00051584

(15)

$$\sqrt{\frac{9}{16}} = \frac{\sqrt{9}}{\sqrt{16}} = \frac{3}{4}; \sqrt{\frac{36}{81}} = \frac{\sqrt{36}}{\sqrt{81}} = \frac{6}{9};$$

$$\sqrt{\frac{121}{169}} = \frac{\sqrt{121}}{\sqrt{169}} = \frac{11}{13}; \sqrt{\frac{81}{400}} = \frac{\sqrt{81}}{\sqrt{400}} = \frac{9}{20}.$$

(16)

$$\frac{7}{11} = 0.63636363\ddot{6}$$

$$\frac{9}{17} = 0.52941176$$

$$\begin{array}{r} 0.63636363 \cdot 7977 \\ \cdot 49 \end{array}$$

$$\begin{array}{r} 0.52941176 \cdot 7276 \\ 49 \end{array}$$

$$\begin{array}{r} 1.49 \overline{)1463} \\ 1341 \end{array}$$

$$\begin{array}{r} 1.42 \overline{)394} \\ 284 \end{array}$$

$$\begin{array}{r} 1.587 \overline{)12263} \\ 11109 \end{array}$$

$$\begin{array}{r} 1.447 \overline{)11011} \\ 10129 \end{array}$$

$$\begin{array}{r} 1.5947 \overline{)115463} \\ 111629 \\ \hline 3834 \end{array}$$

$$\begin{array}{r} 1.4546 \overline{)88276} \\ 87276 \\ \hline 1000 \end{array}$$

(17)

$$428\frac{1}{2} = 428.428571$$

$$\begin{array}{r} 428.428571 \cdot 20.698 \\ 4 \end{array}$$

$$\begin{array}{r} 40.6 \overline{)28.42} \\ 24.36 \end{array}$$

$$\begin{array}{r} 41.29 \overline{)4.0685} \\ 3.7161 \end{array}$$

$$\begin{array}{r} 41.388 \overline{)352471} \\ 331104 \end{array}$$

$$\cdot 021367$$

Exercise 82.]

KEY.

221

(18)

$$629\frac{1}{4} = 629.8$$

$$629.800000(25.095$$

4

$$45)229$$

$$225$$

$$50.09)4.8000$$

$$4.5081$$

$$50.185)291900$$

$$.250925$$

$$.040975$$

(19)

$$1127896\frac{1}{4} = 1127896.25$$

$$1127896.250000(1062.024$$

1

$$206)1278$$

$$1236$$

$$2122)4296$$

$$4244$$

$$212402)52.2500$$

$$42.4804$$

$$2124044)9.769600$$

$$8.496176$$

$$1.273424$$

(30)

213798 · 123700 (462 · 383
10

86)537

516

922)2198

1844

924 · 3)354 · 12

277 · 29

924 · 68)76 · 8337

78 · 9744

924 · 763)2 · 859300

2 · 774289

085011

EXERCISE 83.

(1)

32768(32

27

$$3^2 = 9 \times 300 = 2700$$

$$3 \times 2 = 6 \times 30 = 180$$

$$2^2 = 4$$

2884

5768

5768

6^2 =

6 \times

(3)

$$\begin{array}{r}
 858503(87 \\
 512 \\
 \hline
 8^2 = 64 \times 300 = 19200 \quad 146503 \\
 8 \times 7 = 56 \times 30 = 1680 \\
 7^2 = 49 \\
 \hline
 20929 \quad 146503 \\
 \hline
 \end{array}$$

(3)

$$\begin{array}{r}
 13824(24 \\
 8 \\
 \hline
 2^2 = 4 \times 300 = 1200 \quad 5824 \\
 2 \times 4 = 8 \times 30 = 240 \\
 4^2 = 16 \\
 \hline
 1456 \quad 5824 \\
 \hline
 \end{array}$$

(4)

$$\begin{array}{r}
 250047(63 \\
 216 \\
 \hline
 6^2 = 36 \times 300 = 10800 \quad 34047 \\
 6 \times 3 = 18 \times 30 = 540 \\
 3^2 = 9 \\
 \hline
 11349 \quad 34047 \\
 \hline
 \end{array}$$

(5)

$$\begin{array}{rcll}
 9^3 = 81 \times 300 & = & 24300 & \\
 9 \times 9 = 81 \times 30 & = & 2430 & \\
 & 9^2 = & 81 & \\
 \hline
 & & 26811 & \\
 \hline
 & & 241299 & \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 970299 \text{ (99)} \\
 729 \\
 \hline
 \end{array}$$

(6)

$$\begin{array}{rcll}
 1^3 = 1 \times 300 & = & 300 & \\
 1 \times 2 = 2 \times 30 & = & 60 & \\
 & 2^2 = & 4 & \\
 \hline
 & & 364 & \\
 \hline
 12^3 = 144 \times 300 & = & 43200 & \\
 12 \times 5 = 60 \times 30 & = & 1800 & \\
 & 5^2 = & 25 & \\
 \hline
 & & 45025 & \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 1053125 \text{ (125)} \\
 1 \\
 \hline
 \end{array}$$

$$953$$

$$728$$

$$225125$$

$$225125$$

Exercise 83.]

KEY.

225

(7)

$$\begin{array}{rcl} 2^2 = 4 \times 300 & = & 1200 \\ 2 \times 5 = 10 \times 30 & = & 300 \\ 5^2 & = & 25 \\ \hline & & 1525 \end{array}$$

$$\begin{array}{rcl} 25^2 = 625 \times 300 & = & 187500 \\ 25 \times 1 = 25 \times 30 & = & 750 \\ 1^2 & = & 1 \\ \hline & & 188251 \end{array}$$

15813251 (251

8

7813

7625

188251

188251

(8)

$$\begin{array}{rcl} 3^2 = 9 \times 300 & = & 2700 \\ 3 \times 6 = 18 \times 30 & = & 540 \\ 6^2 & = & 36 \\ \hline & & 3276 \end{array}$$

$$\begin{array}{rcl} 36^2 = 1296 \times 300 & = & 388800 \\ 36 \times 4 = 144 \times 30 & = & 4320 \\ 4^2 & = & 16 \\ \hline & & 393136 \end{array}$$

48228544 (364

27

21228

19656

1572544

1572544

(9)

245314376 (626

216

$$\begin{array}{rcl}
 6^2 = 36 \times 300 & = & 10800 \\
 6 \times 2 = 12 \times 30 & = & 360 \\
 2^2 & = & 4
 \end{array}$$

11164 22328

$$\begin{array}{rcl}
 62^2 = 3844 \times 300 & = & 1153200 \\
 62 \times 6 = 372 \times 30 & = & 11160 \\
 6^2 & = & 36
 \end{array}$$

1164396 6986376

(10)

686.128968 (8.82

512

$$\begin{array}{rcl}
 8^2 = 64 \times 300 & = & 19200 \\
 8 \times 8 = 64 \times 30 & = & 1920 \\
 8^2 & = & 64
 \end{array}$$

21184 169.472

$$\begin{array}{rcl}
 88^2 = 7744 \times 300 & = & 2323200 \\
 88 \times 2 = 176 \times 30 & = & 5280 \\
 8^2 & = & 4
 \end{array}$$

2328484 4.656968

Exercise 83.1

KEY

227

(11)

991026-973 (99-7

729

$$9^2 = 81 \times 300 = 24300$$

$$9 \times 9 = 81 \times 30 = 2430$$

$$9^2 = 81$$

26811

241299

$$99^2 = 9801 \times 300 = 2940300$$

$$99 \times 7 = 693 \times 30 = 20790$$

$$7^2 = 49$$

2961139

20727-973

20727-973

(12)

915498611 (971

729

$$9^2 = 81 \times 300 = 24300$$

$$9 \times 7 = 63 \times 30 = 1890$$

$$7^2 = 49$$

26239

186498

$$97^2 = 9409 \times 300 = 2822700$$

$$97 \times 1 = 97 \times 30 = 2910$$

$$1^2 = 1$$

2825611

183673

2825611

2825611

(13)

$$\sqrt[3]{\frac{8}{27}} = \frac{\sqrt[3]{8}}{\sqrt[3]{27}} = \frac{2}{3}; \quad \sqrt[3]{\frac{125}{1728}} = \frac{\sqrt[3]{125}}{\sqrt[3]{1728}} = \frac{5}{12};$$

$$\sqrt[3]{\frac{343}{729}} = \frac{\sqrt[3]{343}}{\sqrt[3]{729}} = \frac{7}{9}; \quad \sqrt[3]{\frac{64}{125}} = \frac{\sqrt[3]{64}}{\sqrt[3]{125}} = \frac{4}{5}$$

(14)

$$\frac{1}{11} = 0.916666666$$

$$\begin{array}{r} .916666666 \quad (.971 \\ 729 \end{array}$$

$$\begin{array}{rcl} 9^2 = 81 \times 300 & = & 24300 \\ 9 \times 7 = 63 \times 30 & = & 1890 \\ 7^2 & = & 49 \end{array}$$

$$\begin{array}{r} 26239 \\ \hline 183673 \end{array}$$

$$97^2 = 9409 \times 300 = 2822700 \quad 3993666$$

$$97 \times 1 = 97 \times 30 = 2910$$

$$1^2 = 1$$

$$\begin{array}{r} 2825611 \\ \hline 2825611 \end{array}$$

$$\cdot 1168055$$

$$\frac{9}{10} = .9$$

(Continued on next page.)

Exercise 83.]

KEY.

229

(14 continued.)

$$\frac{9}{10} = .9$$

$$\cdot 9000000000 \quad (.965)$$

$$\underline{729}$$

$$9^2 = 81 \times 300 = 24300$$

$$9 \times 6 = 54 \times 30 = 1620$$

$$6^2 = 36$$

$$\underline{25956}$$

$$171000$$

$$96^2 = 9216 \times 300 = 2764800$$

$$96 \times 5 = 480 \times 30 = 14400$$

$$5^2 = 25$$

$$\underline{2779225}$$

$$155736$$

$$\underline{15264000}$$

$$13946126$$

$$\underline{1317875}$$

(15)

$$.9 = 1 \text{ and } \sqrt[3]{1} = 1$$

$$\cdot 1000000000 \quad (.464)$$

$$\underline{64}$$

$$4^2 = 16 \times 300 = 4800$$

$$4 \times 6 = 24 \times 30 = 720$$

$$6^2 = 36$$

$$\underline{5556}$$

$$36000$$

$$46^2 = 2116 \times 300 = 634800$$

$$46 \times 4 = 184 \times 30 = 5520$$

$$4^2 = 16$$

$$\underline{640336}$$

$$33336$$

$$\underline{2664000}$$

$$2561344$$

$$\underline{102656}$$

(Continued on next page.)

(15 continued.)

$$\cdot 1 = \cdot 111111111 +$$

•1111111111111111 (•4807

64

$$4^2 = 16 \times 300 = 4800$$

47111

$$4 \times 8 = 32 \times 30 = 960$$

82 = 64

5824

46592

$$48^3 = 2304 \times 300 = 691200$$

519111

$$480^2 = 230400 \times 300 = 69120000$$

519111111

$$480 \times 7 = 3360 \times 30 = 100800$$

$$7^2 = 49$$

69220849

484545943

34565188

Exercise 83.]

KEY.

251

(16)

(4807

427986 · 714300 (75 · 36
343

$$7^2 = 49 \times 300 = 14700$$

84986

$$7 \times 5 = 35 \times 30 = 1050$$

$$5^2 = 25$$

15775

78875

$$75^2 = 5625 \times 300 = 1687500$$

6111 · 714

$$75 \times 3 = 225 \times 30 = 6750$$

$$3^2 = 9$$

1694259

5082 · 777

$$753^2 = 567009 \times 300 = 170102700$$

1028 · 937300

$$753 \times 6 = 4518 \times 30 = 129540$$

$$6^2 = 36$$

170232276

1021 · 393656

7 · 543664

(17)

$$816\frac{1}{2} = 816.4$$

$$816.400000000 (9.346$$

$$729$$

$$9^2 = 81 \times 300 = 24300$$

$$9 \times 3 = 27 \times 30 = 810$$

$$3^2 = 9$$

$$25119$$

$$87.400$$

$$75.357$$

$$93^2 = 8649 \times 300 = 2594700$$

$$93 \times 4 = 372 \times 30 = 11160$$

$$4^2 = 16$$

$$2605876$$

$$12.043000$$

$$10.423504$$

$$934^2 = 872356 \times 300 = 261706800$$

$$934 \times 6 = 5604 \times 30 = 168120$$

$$6^2 = 36$$

$$261874956$$

$$1.619496000$$

$$1.571249736$$

$$48246264$$

Exercise 83.]

KEY.

233

(18)

$$917167_{11} = 917167 \cdot 363636363 +$$

$$917167 \cdot 363636363 \quad (97 \cdot 158 \\ 729)$$

$$9^2 = 81 \times 300 = 24300$$

$$9 \times 7 = 63 \times 30 = 1890$$

$$7^2 = 49$$

$$26239$$

$$189167$$

$$183673$$

$$97^2 = 9409 \times 300 = 2822700$$

$$97 \times 1 = 97 \times 30 = 2910$$

$$1^2 = 1$$

$$2825611$$

$$4494 \cdot 363$$

$$2825 \cdot 611$$

$$1668 \cdot 752636$$

$$971^2 = 942841 \times 300 = 282852300$$

$$971 \times 5 = 4855 \times 30 = 145650$$

$$5^2 = 25$$

$$282997975$$

$$1414 \cdot 989875$$

$$9715^2 = 94381225 \times 300 = 28314367500$$

$$9715 \times 8 = 77720 \times 30 = 2331600$$

$$8^2 = 64$$

$$28316699164$$

$$253 \cdot 762761363$$

$$226 \cdot 531433312$$

$$27 \cdot 231328051$$

234

KEY.

[ELEM. ARITH

(19)

$$8111471\frac{1}{2} = 8111471 \cdot 692307$$

$$8111471 \cdot 692307 (200 \cdot 928$$

$$2^3 = 4 \times 300 = 12000000$$

$$200 \times 9 = 1800 \times 30 = 54000$$

$$9^3 = 81$$

$$12054081$$

$$111471 \cdot 692$$

$$108486 \cdot 729$$

$$2984 \cdot 963307$$

$$2009^2 = 4036081 \times 300 = 1210824300$$

$$2009 \times 2 = 4018 \times 30 = 120540$$

$$2^2 = 4$$

$$1210944844$$

$$2421 \cdot 889688$$

$$563 \cdot 073619$$

(20)

$$27\frac{1}{2} = 27.75.$$

(200·92

$$3^2 = 9 \times 300 = 270000$$

$$30 \times 2 = 60 \times 30 = 1800$$

$$2^2 = 4$$

$$271804$$

$$302^2 = 91204 \times 300 = 27361200$$

$$302 \times 7 = 2114$$

$$\times 30 = 63420$$

$$7^2 = 49$$

$$27424669$$

$$3027^2 = 9162729$$

$$\times 300 = 2748818700$$

$$3027 \times 5 = 15135$$

$$\times 30 = 454050$$

$$5^2 = 25$$

$$2749272775$$

$$27.750000000000(3.0275$$

$$27$$

$$\cdot 750000$$

$$\cdot 543608$$

$$206392000$$

$$191972683$$

$$14419317000$$

$$13746363875$$

$$672953125$$

EXERCISE 84.

(1)

$$\$7994.70 \div 29 = \$275.67\frac{1}{2}.$$

(2)

Greater minus difference = the less.

$$249 - 127 = 122.$$

(3)

$$£294 \times 400 = 117600$$

$$6s \times 20 = 120$$

$$4\frac{1}{2}d = 18 \text{ far.} \times 5 \div 12 = 7\frac{1}{2}$$

$$£294 \text{ 6s } 4\frac{1}{2}d = \$1177.27\frac{1}{2}$$

$$\$1177.27\frac{1}{2} \div .9 = \$1177.27\frac{1}{2} \div 1 = \$1177.27\frac{1}{2}$$

(4)

$$\$429.80 \times .29 = \$124.642$$

$$\$429.80 - \$124.642 = \$305.158$$

$$\$305.158 \div \$10.20 = \$305.158 \div \$10.200 = \$29.916 +$$

(5)

$$\frac{1}{2} \text{ of } \frac{7}{8} \text{ of } 4\frac{1}{2} = \frac{1}{2} \times \frac{7}{8} \times 4\frac{1}{2} = 8\frac{7}{8}$$

$$2\frac{1}{2} + 4\frac{1}{2} + 8\frac{7}{8} + 3 - 5\frac{1}{2} = 2 + 4 + 3 + \frac{7}{8} + 3 - 5\frac{1}{2}$$

$$= 6\frac{1}{2} + 1\frac{1}{2} + 8\frac{7}{8} + 3 - 5\frac{1}{2} = (6\frac{1}{2} - 5\frac{1}{2}) + 1\frac{1}{2} + 8\frac{7}{8} + 3$$

$$= 1 + 1\frac{1}{2} + 8\frac{7}{8} + 3 = 3\frac{1}{2} + 8\frac{7}{8} + 3 = 3\frac{1}{2} + 8\frac{7}{8} + 3$$

$$= 3\frac{1}{2} + 8\frac{7}{8} = 3\frac{7}{4}$$

(6)

$$\$943.70 \times .095 = \$89.6515 = \text{int. for 1 year at } 9\frac{1}{2} \text{ per cent.}$$

$$\$89.6515 \times 11.2 = \$1004.0968 = \text{int. for 11.2 years at } 9\frac{1}{2} \text{ per cent.}$$

(7)

$$.7 = \frac{7}{10}; .42 = \frac{42}{100} = \frac{21}{50} = \frac{38}{100}; 2357 = \frac{2357 - 23}{9900}$$

$$3333 = \frac{3333}{1000}; .876 = \frac{876}{1000} = \frac{333}{1000}$$

(8)

$$\$28 \text{ on } \$100 = 28 \text{ cents on } \$1.$$

$$\$1.28 \times 2916 = \$3732.48 = \text{selling price for the whole.}$$

$$\$3732.48 \div 729 = \$5.12 = \text{selling price per barrel.}$$

(9)

$\frac{1}{3}$ of $\frac{1}{3}$ of $\frac{1}{3}$ of 63 = $\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times 63 = 8$; then 8 is $\frac{1}{3}$ of how many times 8?

If 8 is $\frac{1}{3}$ of a certain number, $\frac{1}{3}$ of that number will be $\frac{1}{3}$ of 8, which is $\frac{8}{3}$.

If $\frac{8}{3}$ is $\frac{1}{3}$ of a certain number, that number will be 5 times $\frac{8}{3}$, which is $4\frac{2}{3}$ or $4\frac{2}{3}$.

Then $4\frac{2}{3} \div 8 = \frac{1}{3}$.

Therefore 8 is $\frac{1}{3}$ of $\frac{1}{3}$ times 8.

(10)

86172·191300000(44·169
64

$$4^3 = 16 \times 300 = 4800 \quad 22172$$

$$4 \times 4 = 16 \times 30 = 480$$

$$4^2 = 16$$

5296 21184

$$44^3 = 1936 \times 300 = 580800 \quad 988191$$

$$44 \times 1 = 44 \times 30 = 1320$$

$$1^2 = 1$$

582121 582121

$$441^3 = 194481$$

$$\times 300 = 58344300$$

406070300

$$441 \times 6 = 2646$$

$$\times 30 = 79380$$

$$6^2 = 36$$

58423716 350542296

$$4416^3 = 19501056$$

$$\times 300 = 5850316800$$

55528004000

$$4416 \times 9 = 39744$$

$$\times 30 = 1192320$$

$$9^2 = 81$$

5851509201 52663582809

2864421191

(11)

\$376951

279404

19592

38936

\$714883

(12)

lbs. oz. dwt. grs.

$$\begin{array}{r} 27 \quad 4 \quad 6 \quad 17 \times 9\frac{1}{2} = \\ \hline 10 \end{array}$$

lbs. oz. dwt. grs.

$$\begin{array}{r} 259 \quad 11 \quad 3 \quad 17\frac{1}{2} \end{array}$$

$$\begin{array}{r} 273 \quad 7 \quad 7 \quad 2 \times 2 = \\ \hline 10 \end{array}$$

$$\begin{array}{r} 547 \quad 2 \quad 14 \quad 4 \end{array}$$

$$\begin{array}{r} 2736 \quad 1 \quad 10 \quad 20 \times 6 = \\ \hline \end{array}$$

$$\begin{array}{r} 16416 \quad 9 \quad 5 \quad 0 \end{array}$$

$$\begin{array}{r} 17223 \quad 11 \quad 2 \quad 21\frac{1}{2} \end{array}$$

(13)

$\frac{1}{12} = \frac{1}{3}$, dividing each term by 16; $\frac{1}{12} = \frac{1}{3}$ dividing both terms by 121.

$\frac{1}{12} = \frac{1}{12} = \frac{1}{12} = \frac{1}{12} = \frac{1}{12} = \frac{1}{12}$, dividing in succession by 7, by 9, by 11, by 4, and by 4.

$\frac{1}{12} = \frac{1}{12}$ i. e. the terms have no common measure.

(14)

•714625 miles.

8

5 •717000 fur.

40

28 •680000

5½

3 •740000

3

2 •220000

12

2 •640000

5 fur. 28 per. 3 yds. 2 ft. 2½ in.

(15)

$$90 \cdot 478 \div 002693 = 90478000 \div 2693 = 33597 \cdot 4749 +$$

(16)

$$1\frac{1}{2} : \frac{7}{18} :: \$6294\frac{3}{4} : \$6294\frac{3}{4} \times \frac{7}{18} \div \frac{1}{2}$$

$$= \$6294\frac{3}{4} \times \frac{7}{18} \times \frac{1}{2} = \frac{\$6294\frac{3}{4} \times 7 \times 13}{11 \times 15 \times 11} = \frac{\$6300567}{1815} = \$3471 \cdot 38\frac{1}{2}$$

(17)

914 lbs. 7 oz. 5 drs. at \$11.49 per lb.

4 oz.	$\frac{1}{4}$	\$11.49
		914
		<hr/>
		10501.86
2 oz.	$\frac{1}{2}$	2.87 $\frac{1}{2}$
1 oz.	$\frac{1}{4}$	1.43 $\frac{3}{8}$
4 drs.	$\frac{1}{4}$	.71 $\frac{1}{8}$
1 dr.	$\frac{1}{8}$	.17 $\frac{1}{8}$
		.04 $\frac{1}{8}$
		<hr/>
		\$1050711.32

(18)

 $\$1100 \times .07 = \$77 =$ interest for 1 year at 6 per cent.

6 mos.	$\frac{1}{2}$	\$77
		<hr/>
3 days	$\frac{1}{60}$	38.50 = int. for 6 mos.
		.641 $\frac{2}{3}$ = int. for 3 dys.
		<hr/>
		\$39.141 $\frac{1}{3}$ = b'nk. dis. 6 ms.

Interest of \$1 for 6 mos. at 7 per cent. = \$0.035; hence amount of \$1 for given time and rate = \$1.035.

 $\$1100 \div \$1.035 = \$1100000 \div 1035 = \1062.80193
= present worth. $\$1100 - \$1062.80193 = \$37.19807 =$ true discount.

(19)

A, B, and C can do it in 10 days \therefore in 1 day they can do $\frac{1}{10}$ of it. A, working alone, can do it in 28 days \therefore in 1 day he can do $\frac{1}{28}$ of it. C, working alone, can do it in 32 days \therefore in 1 day he can do $\frac{1}{32}$ of it. Therefore A and C working together can do $\frac{1}{28} + \frac{1}{32} = \frac{11}{448}$ of it in 1 day. Hence B can do $\frac{1}{10} - \frac{11}{448} = \frac{117}{4480}$ of it in 1 day; and to finish the whole work he would require as many times 1 day as $\frac{4480}{117}$ is contained times in the whole, i. e. $1 \div \frac{117}{4480} = \frac{4480}{117} = 38\frac{40}{117}$ days.

(20)

$$149\frac{1}{11} = 149.27272727 +$$

$$149.27272727(12.2177$$

1

$$\begin{array}{r} 22 \overline{) 49} \\ 44 \end{array}$$

$$44$$

$$24.2 \overline{) 5.27}$$

$$4.84$$

$$24.41 \overline{) .4327}$$

$$.2441$$

$$24.427 \overline{) .188627}$$

$$.170989$$

$$24.4347 \overline{) 1763827}$$

$$1710429$$

$$53398$$

(21)

$$2000 \div 6\frac{1}{2} = 4000 \div 13 = 307 \text{ hrs. } 41 \text{ min. } 32\frac{1}{3} \text{ sec.}$$

$$= 1 \text{ wk. } 5 \text{ dys. } 19 \text{ hrs. } 41 \text{ min. } 32\frac{1}{3} \text{ sec.}$$

(22)

$$\text{\pounds}219 \text{ 8s. } 11\frac{1}{2} = \$877.78\frac{1}{2}$$

$$\frac{1}{3}\text{ of } 4\frac{1}{2} \text{ of } \frac{1}{4} \text{ of } \frac{1}{5} \text{ of } 24\frac{1}{2} \text{ times } \$976.53$$

$$= \$976.53 \times \frac{2}{5} \times \frac{3}{4} \times \frac{5}{7} \times \frac{2}{7} \times \frac{49}{2}$$

$$= 976.53 \times 9 = \$8788.77$$

$$\$8788.77 - \$877.78\frac{1}{2} = \$7910.98\frac{1}{2}$$

(23)

978 a. 2 r. 1 per. 7 yds. = 18943909 quarter-yards.

2 a. 3 r. 27 per. 2 yds. = 172675 quarter-yards.

 $18943909 \div 172675 = 109.708 + \text{times.}$

(25)

$$\frac{19}{4} \times \frac{11}{5} \times \frac{12}{9\frac{1}{2}} \times \frac{33}{17} = \frac{19}{4} \times \frac{11}{5} \times \frac{24}{19} \times \frac{33}{17}$$

$$= \frac{11 \times 6 \times 33}{5 \times 17} = \frac{2178}{85} = 2178 : 85$$

(26)

15013)27051(1

15013

2038)15013(7

14266

747)2038(2

1494

544)747(1

544

203)544(2

406

138)203(1

138

65

65)138(2

130

8)65(8

64

1)8(8

8

G. C. M. = 1

(27)

If 4 men can do the work in $56\frac{1}{2}$ hours, 1 man will require 4 times $56\frac{1}{2}$ hours, i. e. 225 hours, and hence in 1 hour he would do $\frac{1}{225}$ of the whole work.

If 6 women can do the whole work in $56\frac{1}{2}$ hours, 1 woman would require 6 times $56\frac{1}{2}$ hours, i. e. 337 $\frac{1}{2}$ hrs. and hence in 1 hour she would do $\frac{1}{337\frac{1}{2}} = \frac{2}{675}$ of the whole work, and consequently 2 women will do $\frac{4}{675}$ of the work in 1 hour.

8 boys can do the whole work in $56\frac{1}{2}$ hours, 1 boy would require 8 times $56\frac{1}{2}$ hours, i. e. 450 hours, and hence in 1 hour he would do $\frac{1}{450}$ of the whole work and consequently 5 boys would do 5 times $\frac{1}{450}$ which is $\frac{1}{90}$ of the whole work in 1 hour.

Then 1 man, 2 women, and 5 boys working together will do $\frac{1}{225} + \frac{4}{675} + \frac{1}{90} = \frac{132}{1350}$ of the whole work in 1 hr. and to finish it they would require as many times 1 hr. as $\frac{132}{1350}$ is contained times in the whole, i. e. $1 \div \frac{132}{1350} = \frac{1350}{132} = 46\frac{1}{2}$ hours.

(28)

$$\begin{array}{l|l}
 24 : 32 & \\
 4 : 3\frac{1}{2} & \\
 8 : 21 & \\
 10 : 9 &
 \end{array}
 \quad
 \begin{array}{l}
 5 \\
 40 - 4 \\
 400 \times 32 \times 3\frac{1}{2} \times 21 \times 9 \\
 24 \times 4 \times 8 \times 10 \\
 8 \\
 = 5 \times 3\frac{1}{2} \times 21 \times 3 = 1102\frac{1}{2} \text{ rods.}
 \end{array}$$

(29)

$$\begin{aligned}
 £789 \text{ 14s. 8}\frac{1}{2}\text{d.} &= £789.735416 \times 4.867 = \$3843.6422+ \\
 .70 \div 4.867 &= \$2984700 \div 4867 = £613.25251 \\
 &= £613 \text{ 5s. 0}\frac{1}{2}\text{d.}
 \end{aligned}$$

Exercise 84.]

KEY.

(34)

$$\begin{aligned} \$7900 : \$2700 :: \$2470 : \frac{\$2470 \times 2700}{7900} &= \$844.174\frac{2}{3} \\ &= A's \text{ Share.} \end{aligned}$$

$$\begin{aligned} \$7900 : \$2300 :: \$2470 : \frac{\$2470 \times 2300}{7900} &= \$719.11\frac{1}{3} \\ &= D's \text{ Share.} \end{aligned}$$

$$\begin{aligned} \$844.174\frac{2}{3} + 719.11\frac{1}{3} &= \$1563.29\frac{1}{3} \\ \$2470 - \$1563.29\frac{1}{3} &= \$906.70\frac{2}{3} = C's \text{ Share.} \end{aligned}$$

(35)

$$\begin{aligned} \$1.20 \times 796 &= \$955.20; \$1000 - \$955.20 = \$44.80 \\ &= \text{whole gain.} \\ \$955.20 : \$100 :: \$44.80 : \frac{\$44.80 \times 100}{955.20} &= 4\frac{1}{3}\frac{1}{3} \text{ p. cent.} \end{aligned}$$

(36)

144)9146714 in.

9)63518 ft. 86 in.

304 4	7057 yds. 5 ft. 122 in.
121	28228 quarter-yds. 5 ft. 122 in.

$$\begin{aligned} &233 \text{ per } 35 \text{ qr. yds. 5 ft. 122 in.} \\ &= 233 \text{ per } 8\frac{1}{2} \text{ yds. 5 ft. 122 in.} \\ &= 233 \text{ per } 8 \text{ yds. 11 ft. 230 in.} \\ &= 233 \text{ per } 9 \text{ yds. 3 ft. 86 in.} \\ &= 5 \text{ roods } 33 \text{ per } 9 \text{ yds. 3 ft. 86 in.} \\ &= 1 \text{ a } 1 \text{ r } 33 \text{ per } 9 \text{ yds. 3 ft. 86 in.} \end{aligned}$$

(37)

$$\$2967.80 \times \frac{1}{10} = £890.34 = £890 \text{ cs. } 9\frac{1}{2}\text{d.}$$

$$£29 \text{ 8s. } 11\frac{1}{2}\text{d.} = £29.44791\bar{6} \div \frac{1}{3} = \$78.527.$$

(38)

$$17 \text{ bush. } 1 \text{ pk. } 1 \text{ gal.} = 17.375 \text{ bush.}$$

$$.14672 \times 17.375 = 2.54926 \text{ bush.}$$

—	4
2	.19704
—	2
0	.39408
—	4
1	.57632
—	2
1	.15264

$$2 \text{ bush. } 2 \text{ pk. } 0 \text{ gal. } 1 \text{ qt. } 1.15264 \text{ pt.}$$

8
in 2
in 3
min
The
1 m
=
man
who

(39)

$$7149 \cdot \overline{11} = 7149 \cdot 272727$$

			7149 · 272727 (19 · 26)
		1	—
$1^2 = 1 \times 300 =$	300	6149	
$1 \times 9 = 9 \times 30 =$	270		
$9^2 =$	81		
	—		
	651	5859	
$19^2 = 361 \times 300 =$	108300	290 · 272	
$19 \times 2 = 38 + 30 =$	1140		
$2^2 =$	4		
	—		
	109444	218 · 888	
$192^2 = 36864 \times 300 =$	11059200	71 · 384727	
$192 \times 6 = 1152 \times 30 =$	34560		
$6^2 =$	36		
	—		
	11093796	66 · 562776	
		—	
		4 · 821951	

(40)

Since one pipe can fill the cistern in 40 and the other in 25 minutes, the one will fill $\frac{1}{40}$ and the other $\frac{1}{25}$ of it in 1 minute, and since the third pipe empties it in 30 minutes, in 1 minute it will empty $\frac{1}{30}$ of its contents. Then if all three pipes be left open, the part filled in 1 minute will be $(\frac{1}{40} + \frac{1}{25}) - \frac{1}{30} = \frac{1}{400} + \frac{1}{200} - \frac{1}{300} = \frac{19}{600}$. And to fill the cistern they will require as many times 1 minute as $\frac{19}{600}$ is contained times in the whole, i. e. $1 \div \frac{19}{600} = \frac{600}{19} = 31\frac{11}{19}$ minutes.

(41)

$$71413 \div 91467 = 7141300 \div 91467$$

$$91467 \overline{) 7141300} \cdot (78 \cdot 075$$

$$\underline{640269}$$

$$738610$$

$$\underline{731736}$$

$$687400$$

$$\underline{640269}$$

$$471310$$

$$\underline{457335}$$

$$13975$$

(42)

From 43 a. 2 r. 7 per. 0 yds.

Take 19 3 27 18

Diff. = 23 2 19 12½ yds.

ac. r. per. yds. ft. in.

ac. r. per. yds. ft. in.

$$\begin{array}{r} 23 \ 2 \ 19 \ 12 \ 2 \ 36 \\ \times 8 = 188 \ 3 \ 35 \ 7 \ 2 \ 36 \\ 10 \end{array}$$

$$\begin{array}{r} 236 \ 11 \ 34 \ 1 \ 4 \ 72 \\ \times 7 = 1653 \ 1 \ 38 \ 10 \ 4 \ 72 \\ 10 \end{array}$$

$$\begin{array}{r} 2362 \ 0 \ 20 \ 15 \ 0 \ 0 \\ \times 3 = 7086 \ 1 \ 21 \ 14 \ 6 \ 108 \end{array}$$

$$\text{Sum} = 8928 \ 3 \ 15 \ 14 \ 4 \ 72$$

$$= 8928 \ 3 \ 15 \ 2 \ 2 \ 36$$

Exercise 84.]

KEY.

249

(43)

278 yds. 3 qrs. 1 na. 2 in.

$$\begin{array}{r}
 4 \\
 \hline
 1115 \text{ qrs.} \\
 4 \\
 \hline
 4461 \text{ na.} \\
 2\frac{1}{2} \\
 \hline
 8924 \\
 1115\frac{1}{2} \\
 \hline
 10039\frac{1}{2} \text{ inches}
 \end{array}$$

(44)

$\frac{2}{7}$ of $3\frac{1}{4}$ of $6\frac{1}{2}$ of $8\frac{1}{2}$ of $\frac{9\frac{1}{2}}{11\frac{1}{2}}$ of $\frac{8\frac{1}{2}}{17\frac{1}{2}}$ of $\cdot 9$ of $\frac{2}{3}$ of $\cdot 63$

$$= \frac{2}{7} \times \frac{13}{4} \times \frac{13}{2} \times \frac{25}{3} \times \frac{\frac{19}{2}}{\frac{24}{2}} \times \frac{\frac{17}{2}}{\frac{27}{2}} \times \frac{9}{10} \times \frac{2}{3} \times \frac{63}{100}$$

$$= \frac{2}{7} \times \frac{13}{4} \times \frac{13}{2} \times \frac{25}{3} \times \frac{57}{68} \times \frac{17}{35} \times \frac{9}{10} \times \frac{2}{5} \times \frac{63}{100}$$

$$= \frac{13 \times 13 \times 57 \times 9 \times 9}{7 \times 4 \times 4 \times 10 \times 100} = \frac{719273}{619273}$$

ft. in.
2 36

4 72

6 108

4 72

2 36

(45)

23 a. 3 r. 30 per. at \$47.80 per acre.

2 roods	$\frac{1}{2}$	\$47.80
		23
		<hr/>
		\$1099.40
1 rood	$\frac{1}{2}$	23.90
20 per.	$\frac{1}{2}$	11.95
10 per.	$\frac{1}{2}$	5.97 $\frac{1}{2}$
		<hr/>
		2.98 $\frac{1}{2}$
		<hr/>
		\$1144.21 $\frac{1}{2}$

(46)

\$100 stock = \$1.08 $\frac{1}{2}$ money or \$1 stock
= \$1.08 $\frac{1}{2}$ money.

$$\$1.08\frac{1}{2} \times 2400 = \$2604.$$

(47)

50 miles = $50 \times 5280 \times 12 = 3168000$ inches

2 ft. 5 in. = 29 inches = inches in 1 pace.

 $3168000 \div 29 = 109241\frac{11}{29} = \text{number of paces.}$

(48)

$$\$100 + \$16 = \$116$$

$$\$116 : \$100 :: \$7890 : \frac{\$7890 \times 100}{116} = \$6801.72\frac{1}{3}.$$

(49)

Int. of \$1 for 7 yrs. 3 mos. 20 days or for 87 mos. 20 dys.

$$= \$0.435 + \$0.003\frac{1}{2} = \$0.438\frac{1}{2}$$

$$\$0.438\frac{1}{2} \times 894.80 = \$392.220\frac{1}{2}$$

Exercise 84.]

KEY.

351

(50)

A can do the whole work in 24 days, hence in 1 day he can do $\frac{1}{24}$ of it.

B can do the whole work in 30 days, therefore in 1 day he can do $\frac{1}{30}$ of it.

In 7 days A does $\frac{7}{24}$ of the work, leaving $\frac{17}{24}$ to be done by A and B together.

Then $\frac{17}{24} + \frac{1}{30} = \frac{30}{240} =$ work done by A and B together.

$$\frac{17}{24} \div \frac{30}{240} = \frac{17}{24} \times \frac{240}{30} = \frac{17 \times 10}{3} = \frac{170}{3} = 56\frac{2}{3} \text{ days.}$$

(51)

2 lbs. 3 oz. 4 dwt. = 13056 grains.

11 lbs. 7 oz. 9 dwt. 4 grs. = 66940 grains

$$\frac{13056}{66940} = \frac{3264}{16735}.$$

(52)

£493 16s 4½d = 237033 half-pence

£8 11s 7d = 4118 "

$$237033 \div 4118 = 57\frac{1117}{4118}$$

(53)

Assu'e 20	5..8..11..14..16..20..22..176..616..42
Assu'e 21	44..154..21
	44.. 22

$$l. c. m. = 20 \times 21 \times 44 = 18480$$

(54)

\$5.34 \times 419 = \\$2237.46 = \text{value of flour}

\$2237.46 \times .1125 = \\$251.71425 = \text{commission.}

(55)

$$73 \text{ cents} \times 47 = \$34.31 = \text{value of barley.}$$

$$\$34.31 \div 69 = 49\frac{1}{3} \text{ cents} = \text{value of oats per bushel.}$$

(56)

$$\$4250 \times .0125 = \$53.125 = \text{insurance.}$$

(57)

$$\begin{aligned} A &= 207 \times 4 = 828 \\ B &= 109 \times 5 = 545 \\ C &= 43 \times 5 \times 4\frac{1}{2} = 967\frac{1}{2} \end{aligned}$$

$$\text{Sum} = 2340\frac{1}{2}$$

$$2340\frac{1}{2} : 828 :: \$200 : \frac{\$200 \times 828}{2340\frac{1}{2}} = \$70.75\frac{1984}{4681}$$

$$2340\frac{1}{2} : 545 :: \$200 : \frac{\$200 \times 545}{2340\frac{1}{2}} = \$46.57\frac{583}{4681}$$

$$2340\frac{1}{2} : 967\frac{1}{2} :: \$200 : \frac{\$200 \times 967\frac{1}{2}}{2340\frac{1}{2}} = \$82.67\frac{1173}{4681}$$

(58)

$$\begin{aligned} 23 \text{ at } 80 \text{ cents} &= 1840 \text{ cents.} \\ 19 \text{ at } 75 \text{ cents} &= 1425 \text{ cents.} \\ 30 \text{ at } 40 \text{ cents} &= 1200 \text{ cents.} \\ 42 \text{ at } 60 \text{ cents} &= 2520 \text{ cents.} \end{aligned}$$

$$\text{lbs. in mixture} = 114 \quad \text{worth} \quad 6985 \text{ cents.}$$

$$6985 \text{ cents} \div 114 = 61\frac{31}{114} \text{ cents} = \text{price of 1 lb.}$$

Exercise 84.]

KEY.

253

(59)

shel.

A gets 1 share, B gets 1 share, C gets 2 shares, and D gets 4 shares ; therefore they together get 8 times A's share or B's share.

$$\$1100 \div 8 = \$137.50 = \text{A's share} = \text{B's share.}$$

$$\$137.50 \times 2 = \$275 = \text{C's share.}$$

$$\$137.50 + \$137.50 + \$275 = \$550 = \text{D's share.}$$

(60)

$$\begin{array}{l|l}
 15 : 25 & \\
 36 : 48 & \\
 12 : 8 & \\
 6 : 5 & \\
 12 : 9 &
 \end{array}
 \quad
 \begin{array}{l}
 5 \qquad \qquad 4 \quad 2 \\
 10 \times 25 \times 48 \times 8 \times 5 \times 9 \\
 \hline
 15 \times 36 \times 12 \times 6 \times 12 \\
 3 \qquad 4 \qquad \qquad 3 \quad 3 \\
 5 \times 25 \times 2 \\
 \hline
 3 \times 3 \times 3 = 9\frac{1}{27}.
 \end{array}$$

:: 10 : Ans. =

THE END.